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Physiological Effects of Age on the Visual Process

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New York, N. Y.

Normal function of the eye is reduced in old age, and it is more likely to be affected by disease; yet according to the author's studies only 15 per cent of old persons have visual impairment serious enough to interfere with their activities. Of this number, many may be helped by surgery or visual aids.*

THE role of visual care has now shifted; its purpose and aims are now to maintain visual function against the inroads of time, the onset of degenerative processes which are essentially destructive of function, the lowering of metabolic rates and the deficiency of blood supply resulting from sclerosis of the vascular system. The problem is further complicated by the fact that with a lowering of physical activity resulting from old age, there is an attempt to increase mental activity, and such activity is usually through the eyes. In order to be able to cope with this problem it is essential to know and understand how age affects the function of the eye in its major activities. The functions which will be considered are: visual acuity; maintenance of normal intraocular tension; ability to adapt to extremes of light and dark; perception of color; motility and binocular vision; mechanism of accommodation; and maintenance of the flow of tears.

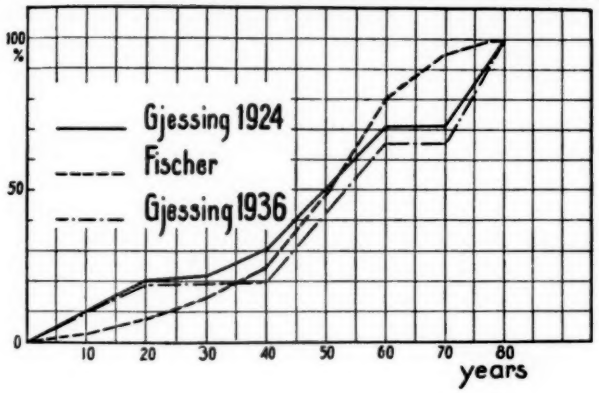
Changes in the Lens

Vision and visual acuity are dependent upon many factors. Chief among these are the transparency of the media of the eye and the integrity of the light-perceiving mechanism—the retina, the nerve conduction mechanism and finally the higher cerebral centers. Unfortunately it is in this very collection of systems that age produces some of its most damaging effects on visual acuity. Of all the transparent media through which light must pass the lens is the most important tissue. The lens develops opacities as it ages which in time will completely obscure vision. This is one of the great hazards of old age and one in which the medical profession has been able to do the most good.

The removal of the cataract by surgical means has been a great boon

*A paper presented at the Bicentennial Symposium on the Role of Visual Care in the Acquisition and Utilization of Knowledge; Department of Optometry of Columbia University; March 17–18, 1954. Conference IV—The Role of Visual Care in the Maintenance of Cultural Activity of the Aged.

Figure I—Cataract Formation in Relation to Age



Cataract. Comparative frequency distribution of acquired cataract at different ages. The general outlines of an S curve (a saturation curve) are seen in the data from Gjessing, the upper and lowermost curve, and more clearly from the middle curve on personal material. The contrast to the curves for glaucoma and retinal detachment are striking.

to mankind, restoring vision to a large segment of the aged population, enabling them to maintain visual activity and thus brighten what would otherwise be a dreary and dismal period in declining life. The question as to whether cataract formation is the result of a normal physiological process or a pathological one is still somewhat debatable. Studies made by several groups of investigators, including our own studies of the eyes of the aged residents at the Home for Aged and Infirm Hebrews, indicate a high percentage of cataract formation. If an individual lives long enough, one may say that cataract formation is inevitable.

These graphs (Fig. I) show saturation curves indicating inevitability of cataract formation. The question is, however, how long one has to live in order to develop cataracts which will interfere markedly with vision, and what percentage of our aged population ever get to surgery. Our study has shown so far that less than 15 per cent of 1,000 aged persons have sufficient impairment of vision to interfere with normal activity for this segment of population and, strangely enough, less than 5 per cent ever come to surgery. There are many reasons for this discrepancy. Many people with cataract in one eye and fair vision in the other eye are able to maintain themselves satisfactorily in their environment with the better eye. Also, old people have other infirmities which might increase the risk involved in operative interference. However, of late it has been shown by one of our group who studied this phase of the problem, Dr. Morris Feldstein, that individuals with marked physical disability are still able to undergo the risk involved in cataract extraction with a high degree of assurance of success. The use of sutures to unite the wound edges firmly, and thus permit early ambulation of the patient, has been a great help in reducing the so-called contra-indications to operation.

Figures I, II, III, IV and V are from "Senescence of the Eye" by F. B. Fischer in MODERN TRENDS IN OPHTHALMOLOGY—2nd Series, edited Arnold Sorsby; by courtesy of the publishers, Butterworth and Company Ltd., London, England. U.S.A. Edition published by Paul B. Hoeber, Inc., New York.

Effect on the Retina

Next is the light-perceiving mechanism—the retina. This organ of light perception shows the least amount of change due to aging. Fischer[1] goes so far as to say that age per se does not show in the retina. I have examined the retinas of over 350 aged eyes post mortem and have found a high percentage of normal retinas. And yet some changes do take place which are the result of age, which are evident in the loss of visual acuity and which cannot be attributed to apparent changes either in the transparent media or in the retina. Fischer and others have found that the visual acuity of octogenarians is generally about 50 per cent of normal in eyes showing no demonstrable pathological changes. This loss of visual acuity—which is only partly confirmed by our studies—is due to changes of a chemical or histological nature not discernible by methods commonly used today.

The horizon in the field of cellular metabolism and cellular structure is widening with great rapidity. Cellular structure can be magnified to 60,000 times the natural size with the electron microscope and projected on a screen up to 4 million times the natural size. This has brought us information on cellular structure unknown up to now. Another investigator, Britton Chance,[2] has worked with an ingenious arrangement using prisms and mirrors and a beam of light through a culture of living cells. He has studied the changes in enzyme action of the cells by noting the difference in the light spectrum. This use of optical means to study cell function is a new departure which promises to furnish important leads and information.

To get back to the retina: The eye is part of the body and is bound to be influenced by its metabolism and vascular condition, not to mention its illnesses. The part of the retina most susceptible to these changes is the macular region. This is the area of sharpest or daylight vision. Our studies have shown that when the retina is involved in old age it is usually in this area that it shows itself most generally. What actually causes macular degeneration of the senile type is the subject of our investigation at the Home. The causes may be vascular, in the retina or choroid, or neurotrophic in the nerve endings, the rods and cones or the associated nerve fibre mechanism. But in the 15 per cent of the aged population with poor vision this is one of the major causes of visual impairment; one for which little can be done by medical or surgical means.

Light and Dark Adaptation

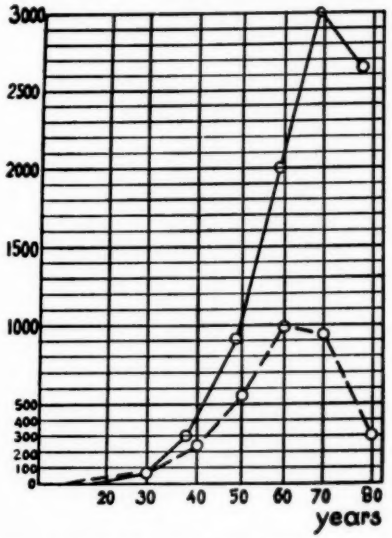
Another function of the eye is the ability to adapt to extremes of light and dark. The function is believed to reside chiefly in the retina. Studies are available which show that the capacity to adapt to lower light threshold especially is diminished in older people. Birren, Bick and Fox,[3] and Birren and Schock[4]—in two separate papers—reported a significant age decline in sensitivity of the dark-adapted eye. This sensitivity decline was more marked in subjects beyond the age of 60. Also, an increased range of individual differences was found in this older age group. The Hecht-Schlaer adaptometer was used—an instrument developed at Columbia in the department of biophysics. This

disability is believed to be due to the inability to regenerate rhodopsin. This in turn is dependent to a large extent on the ability to metabolize vitamin A, which is the significant component of visual purple in the retina; and that in turn is dependent on the food intake, the digestive process and the liver. One has but to point out this relationship to emphasize the interdependence of bodily functions.

Perception of Color

Color perception and differentiation is another function of the retina. Color vision is believed to diminish in old age for the same unknown reasons that vision diminishes. There is also a physical basis for poorer color perception in the increased yellow color of the lens which acts as a yellow filter, cutting out blue light. Chapanis,[5] working on this problem in 1950, was not able to show much of a diminution in color perception. At the Sesquicentennial in Baltimore, 574 people between the ages of 7–77 years who visited this testing booth were given five different color tests. At age 15 and older the correlations were all zero, showing that older people are not significantly handicapped in color vision tests. It was also found that there is some evidence of a positive relationship between visual acuity and color vision test scores; but even here the correlations were so small as to be practically insignificant. This is also borne out by our studies of the aged population at the Home, using only two color test charts.[6, 7] In those patients on whom cataract operations were performed color perception was good, with perhaps an excess of bluishness in the environment.

Figure II—Probability Curve for Acute Glaucoma with Reference to Age

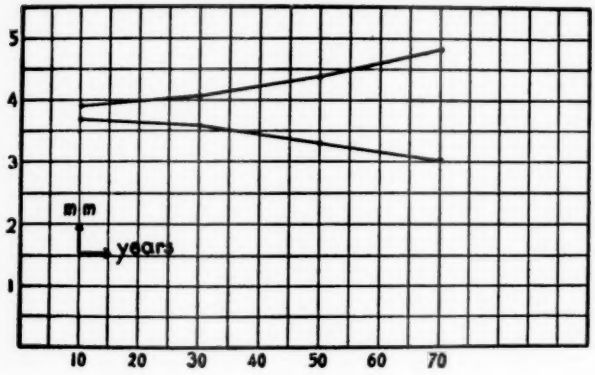


Upper curve in this graph shows that the probability of a primary attack of glaucoma is 3,000 times as great in the 7th decade as in the 1st, 160 times as great as in the 2nd and 40 times as great as in the 3rd. The lower curve shows the frequency of acute glaucoma in the different age groups.

Intraocular Pressure

Maintenance of normal intraocular pressure or tension is dependent upon the ability of the eye to produce the aqueous fluid and to allow for the escape or outflow of this fluid from the eye. An equilibrium must be maintained for normal intraocular pressure. Our studies have shown that the majority of old people maintain a relatively normal pressure. But there is a *tendency* to increased intraocular pressure—or glaucoma—which is significant. This is also shown by studies of glaucoma statistics collected by Lohlein and used as a basis of the probability of glaucoma in any particular age decade. From this graph

Figure III—Depth of Anterior Chamber in Relation to Increased Thickness of the Lens



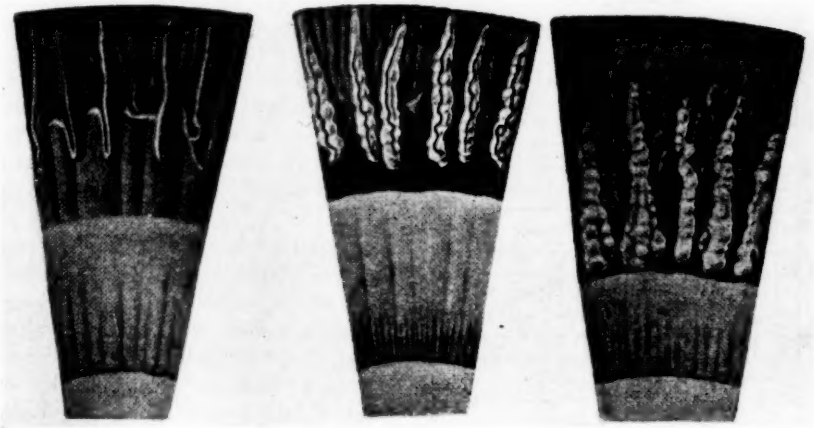
The influence of increasing thickness of the lens on the depth of the anterior chamber. The lens increases in thickness throughout life, as is shown in the upper curve. The anterior chamber becomes shallower correspondingly, as is shown in the lower curve.

(Fig. II) the probability of a primary attack of glaucoma is 3,000 times as great in the 7th decade as in the first; 160 times as great as in the 2nd decade; 40 times as great as in the third. The first three decades contain only 3 per cent of all cases of primary glaucoma, apart from buphthalmos. In the first 4 decades there are only 10 per cent, whereas 90 per cent are in the remaining and older decades.

Why does this happen? Where is the physiological disturbance that brings about the setup of conditions favoring the increased tendency to glaucoma? There are many theories, but the final answer is still unknown. There are known physical factors which tend to interfere with the outflow of the aqueous fluid and this causes a damming back, with a consequent increase in intraocular pressure. The lens of the eye increases in size steadily throughout life. This naturally causes a diminution in the depth of the anterior chamber (Fig. III) and impinges on the angle of the anterior chamber. The same amount of fluid having to occupy a relatively smaller space, and being itself incompressible, will be pushed in all directions and tend to raise the intraocular pressure. The ciliary body which produces the aqueous becomes thicker and more space-filling than in the young eye. This is well shown in Fig. IV on the change in the appearance of the ciliary body in different ages. This increase in thickness is caused by the deposit of hyaline substance in the ciliary processes and tends still further to diminish the available space for the aqueous.

The pupil is also related to this process. The aqueous must flow through the pupil from the posterior chamber behind the iris to the anterior chamber in front of the iris. The pupil has a tendency to become smaller in old people and sluggish in its reaction to light. This is shown by the graph (Fig. V) depicting the changes in the size of the dilated and the undilated pupil at different ages. It will be seen that the pupil gets gradually smaller as the person gets older until it remains almost the same in size under all conditions. Pathologically, this has been found to be due to several factors: atrophy of the dilator muscle fibres, sclerosis of the iris blood vessels,

Figure IV—Increase in Thickness of Ciliary Processes in Old Age



(a) (b) (c)

(a) Ciliary body of the new-born infant. The ciliary processes are still simple and narrow; the intervening spaces are well defined. (b) Ciliary body of a woman aged 59 years; the ciliary processes are still very simple; their apices stand well away from the margin of the lens. (c) Ciliary body of a woman aged 80 years; the knob-like extremities of the ciliary processes come well forward on to the margin of the lens.

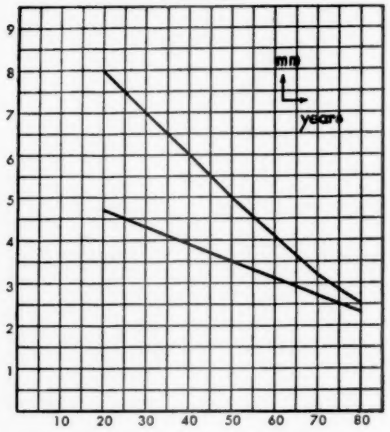
and deposition of hyaline substance in the tissue below the sphincter muscle. This may further help to dam back the aqueous and interfere with its outflow.

Also there is the factor of pigment deposits in the trabeculae of the anterior chamber. The aged eye loses some of its pigment cells and pigment granules from the posterior surface of the iris, the margin of the iris, and probably also from the stroma. These pigment granules circulate in the aqueous and are deposited on the posterior surface of the cornea and in the meshwork of the trabeculae of the anterior chamber. This may be another factor in damming back the outflow of the aqueous and increasing the intraocular tension; so much so that this type of glaucoma is called pigmentary glaucoma. I am not convinced that this is an important factor, since my studies have shown many slides with considerable pigment in the trabeculae of the anterior chamber in patients who did not have glaucoma during life.

All the factors which have been mentioned—increase in lens size, increase in thickness of iris and ciliary body, and pigment migration—help to explain the greater tendency of the aged eye to increased intraocular pressure. Another theory holds that the intraocular tension is under the control of a central regulating mechanism located probably in the midbrain. Anatomical proof of such a center is not available, but there is some clinical evidence in its favor.

In testing for glaucoma in older people one must take into consideration the increased rigidity of the sclera. This subject was given proper emphasis by Friedenwald,[8] who devised a chart for normalizing the read-

Figure V—Diminution of Size of Pupil with Increasing Age



Size of pupil in relation to age. The upper curve relates to the nocturnal (or darkness) pupil, and the lower to the diurnal (or brightness) pupil. With advancing age the size of the pupil is almost equal under these two conditions.

ings found with the Schiøtz tonometer. His technique calls for taking tension with two different weights—a 5 mg. and a 10 mg. weight. The readings will be different in patients with increased scleral rigidity. In patients with normal rigidity the readings are the same. Thus techniques have to be varied in older people to allow for the tissue changes. The scleral rigidity is believed to be due to loss of water content and the deposition of calcium salts in the tissue.

Accommodative Power

The lessening in accommodative power with age is well known. It is the change known as presbyopia which requires persons with normal distant vision to wear glasses in order to be able to read fine print, and for people who wear glasses to get bifocals or separate pairs of glasses for the same purpose. The cause of presbyopia is twofold: the lens loses its elasticity and cannot expand and contract sufficiently to allow for the necessary change in dioptric power; and there is a change in ability of the ciliary muscle to expand and contract. The muscle fibres are replaced in large part by fibrous and hyaline tissue, which do not have the capacity to contract as normal muscle tissue. (In the cross section of the ciliary muscle shown here the replacement of muscle tissue by pale-staining fibrous and hyaline tissue can readily be seen.) An interesting sidelight on the association of accommodative power and life expectancy was brought out by Steinhaus in 1930.[9] He noted a distinct correlation between increased life expectancy and increased accommodative power. He suggested the use of this test by life insurance companies. This work is being re-evaluated as part of our research project at the Home for Aged.

Motility and Muscle Balance

The changes in motility and muscle balance in the aged have not been given much consideration by investigators. An occasional reference is found to loss in tone of the extraocular muscles; there is hardly any reference to binocular vision and muscle balance. The nearest approach to such a test was the work done by Weston,[10] who in 1948 tested the effects of age and illumination upon visual performance. The test consisted of crossing off certain Landolt circles on a chart under different conditions of illumination ranging from 0.5 lumen per square foot to 500 lumens per square foot. There is a steady decline in visual performance from the youngest to the oldest group. In the most severe test

Figure VI—Fibrosis and Hyalinization of Fibres of Ciliary Muscle

A

A.—Fibrosis of ciliary muscle fibres

the decline averaged 7 per cent per year. In the youngest group the difference between lowest and highest illumination is only 18 per cent; in the oldest group it was over 4 times as much. This is not a test of visual resolving power, but of quickness of perception. Visual efficiency appears to come to its maximum in early adulthood, and thereafter to fall off at a greater rate than is realized.

Flow of Tears

Briefly, I would like to discuss the flow of tears in the eyes of the aged as compared to that in the young. I am not aware of any studies on the actual rate of flow of tears in the aged. Rather the basis for the supposition that the rate is reduced is in the loss of lustre and brilliance of the cornea of the old eye. Fischer reports on reflectographic studies of the cornea and mentions a diminution of refraction quotient between the epithelium and the lacrimal layer of the cornea. The importance of the lacrimal layer of the cornea can best be appreciated when it is absent in those patients who have dry eyes, in whom lacrimal function is sharply diminished or absent. Discomfort is great and visual acuity is diminished. These patients are now helped by using substitute tears.

Summary

To summarize: It has been found that there is a considerable reduction in normal function in the human eye

as it grows old. Visual acuity is reduced, accommodative power becomes steadily weaker, dark adaptation is diminished, color perception may be weakened, the efficiency of visual performance is considerably reduced, and there is a greater tendency to be affected by metabolic and vascular diseases which are present in the aged.

With old age there is also a greater tendency to develop glaucoma and retinal detachment, and cataract formation of varying degrees of severity is almost inevitable. Nevertheless, there is great individual variation even in the oldest age groups. Only a relatively small percentage have sufficient visual impairment to interfere with their activities both physical and visual—only 15 per cent. And of this number many may be helped either by surgery or by the use of visual aids. The eye is so adaptable that its capacity to function well past the century mark has been postulated. Only by more study on how to live properly during our early and mature years will we learn how to prevent and circumvent the hazards of old age.

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Joint Professional Committee

Five years ago the Illinois Society for the Prevention of Blindness set up a plan for the creation of a joint professional committee on which both medicine and optometry would be represented. The objective was to provide advisory services to school administrators in establishing school visual screening programs. This plan was accepted by leading medical and optometric societies in Illinois in 1949.

At the present time there are 44 ophthalmologists and 44 optometrists serving on a total of 40 joint committees which give professional direction to visual screening in 52 counties throughout the state. This plan has proved to be most successful.

THE CLEVELAND GLAUCOMA SURVEY

BENJAMIN J. WOLPAW, M.D.
Cleveland, Ohio

and

ALLAN W. SHERMAN, M.A.
Director, Cleveland Society for the Blind

In a mass one-day survey encompassing all of Greater Cleveland over 12,000 tensions were taken. Approximately two per cent incidence of undetected glaucoma in adults was found.

IN 1951 Brav and Kirber[1] reported their findings on the first mass case-finding study of the early detection of glaucoma. It took six years to complete this study, sponsored by the Philadelphia Committee for the Prevention of Blindness, and to report the findings on 10,000 persons examined.

If the observations of those prominent in the field of prevention of blindness[2] are correct, about 2 per cent of the adult population have undiagnosed glaucoma and 12 per cent of adult blindness in the United States is caused by glaucoma. Obviously it would be physically impossible to ferret out the glaucoma suspects in this country and to reduce the incidence of blindness if it took six years to screen every 10,000 persons.

The findings in the Philadelphia survey presented a challenge to the medical profession to arouse itself from its present state of doing nothing until a subject presented himself with obvious signs of glaucoma, and to make a more determined effort to find persons with glaucoma before the signs and symptoms were apparent.

In answer to this challenge the Cleveland oculists elected to conduct a mass one-day glaucoma survey encompassing all of Greater Cleveland in an effort to stimulate the early detection of the disease. The survey was sponsored by the Cleveland Society for the Blind at the request of these Cleveland oculists. From the outset it was determined that the prime interest was to find as many people as possible with undetected glaucoma rather than to conduct a well-controlled statistical study. (The latter was accomplished by the Philadelphia study, and the time, effort, and money expended on it need not necessarily be repeated by every committee interested in early glaucoma detection.)

Organization of the Project

The working management of the survey was under the control of an Executive Committee of representatives of the Cleveland Society for the

Blind and the oculists. To secure a broad base of community interest, responsibility, and help, a large Citizens Advisory Committee was established.

The program was known as "Operation Glaucoma" and culminated on November 4, 1953, which was publicized as "G" Day. Sixteen hospitals throughout Greater Cleveland readily made space available for our use on the survey day. The program was so set up that there would be no cost to the hospitals. All necessary medical supplies and equipment employed were supplied by the project. They included absorbent cotton, tetracaine solution, paper towels, and medicine droppers. Each hospital received sufficient medicine droppers so as to allow for sterilization after each use.

Two hundred and fifty women volunteers were organized and assigned among the hospitals to handle the clerical work and to assist the doctors. Fifty-nine practicing oculists in Cleveland were assigned to the hospitals irrespective of their own hospital affiliations. The number of doctors assigned to each hospital was based upon the committee's judgment as to the number of people expected. Teams of six were set up to handle reception, registration, table assistance, anesthesia, tonometry, and interpretation. The team plan worked well although the crowding at some hospitals made efficient work very difficult.

On the survey day a headquarters post was set up at the Society for the Blind where station wagons and drivers were available to deliver extra supplies to those hospitals running short. Each person attending the survey was registered on an IBM card that included the following data: name, address, age, sex, color, tension each eye, and the name of the hospital attended.

Educational Program

To educate the public regarding a medical disease about which few had ever heard all available means for publicity were employed. The story of glaucoma, "the thief in the night," was told in plain language that the layman could understand in the daily newspapers, in the neighborhood and foreign-language newspapers, and in church bulletins. On the Sunday prior to "G" Day the survey was announced from pulpits throughout the city. The day preceding the survey each newspaper carried an editorial urging the people to take advantage of this opportunity. On the day of the survey the only Cleveland morning paper had a large box announcement on its front page reminding the people that this was "G" Day, and indicating the exact entrance to be used at each hospital. Large signs (4′ x 6′) were placed outside each hospital. "G" signs and arrows clearly marked the way to examining points.

A movie about glaucoma, prepared by the Canadian National Institute for the Blind, was shown on television and a live demonstration of the measurement of intra-ocular tension was presented on a popular evening news telecast. A one-minute talking movie was made showing the entire procedure that a subject would go through from the time he entered the hospital until he was ready to leave. This was shown in 25 motion picture theatres for two days prior to the survey day. TV slides and audio to accompany them were used on all three television stations. Many interviews were set up for radio with volunteer and profes-

sional personnel. Perhaps the most effective tool was the repeated use of 10-second station breaks carried by seven radio stations. These were used with increasing frequency prior to and on the morning of November 4th. Poster cards telling of the survey were carried in every bus of the Cleveland Transit System for one week.

During the entire educational program every effort was made to tell the story of glaucoma without causing undue alarm or hysteria. On the evening prior to the survey many in the profession felt that we had not had sufficient publicity because we were competing with an exciting mayoralty election on the preceding day; and they even wondered whether it would be a good idea to take along a deck of cards with which to keep occupied.

Survey Day

November 4th dawned bright, and a large segment of the population of Cleveland arose early, intent on having their tensions taken. The doors of hospitals were to be open from 9:00 a.m. to 5:00 p.m.; by eight o'clock in the morning, however, there were long lines of people in front of each of the 16 hospitals. It was difficult for the doctors to make their way through the crowds so as to enter the buildings. Within one hour every hospital was calling for more help both in manpower and supplies. Although we had intended to look at each fundus in addition to taking the tension, this procedure had to be abandoned in 12 of the 16 hospitals. A conservative estimate indicates that about 18,000 people came for the free, brief examination.

Not only were the eye physicians surprised at the turnout for this test, but the physicians from other departments were astounded that so many citizens were interested in their eyes. Everyone has become educated to chest and diabetes surveys, but here was something totally new which had attracted greater interest than either of the other surveys. Hospital superintendents assigned nurses to help out and gladly supplied lunches to the workers so that they could continue their task with the least interruption.

By 2:30 p.m. a survey of the hospitals disclosed that there were sufficient people still in line to occupy the doctors' time until the closing hour of five o'clock. We also knew that when the three o'clock factory shift changed thousands of men would come to the hospitals, creating a situation that we realized could not be handled satisfactorily. We therefore asked the radio and TV stations to make emergency newscasts asking that no one else come to the hospitals on that day. At three o'clock it became necessary to close the doors to newcomers; yet, it took three additional hours to finish the examinations at most hospitals.

Each subject tested was told that if there was any suspicion of trouble he would be notified by mail. No information was given at the time of the test except in a few instances where the tension was over sixty in one or both eyes and the subject was not under treatment. The examining physician either suggested to the subject that it would be wise for him to see an oculist as soon as possible, or the information was telephoned to the survey headquarters and letters were in the mail to these people that same day.

A grand total of 12,803 people had their tensions measured during the eight-hour period. Many thousands

were turned away. No attempt was made to set another day to examine these people, but it is known that many of them arranged for examinations with their own doctors or hospital clinics.

At the close of the survey day the IBM cards were key-punched and sorted first for tension. All cards having a tension of 30 mm. or more Schiøtz or 40 mm. McLean in either eye were separated. Each of these subjects received a letter within a few days stating that as a result of his test on the survey it would be wise to consult an eye physician or hospital clinic for a more thorough test. Included with this letter was a card to be filled out by the examining oculist stating whether in his opinion this subject did or did not have glaucoma. The card was to be returned by mail, enclosed in an envelope.

At the end of three months those suspected people from whom we had not heard received a second letter. Those still not heard from at the end of five months received a third letter. In many instances the reason for the delay was that in borderline cases the oculist wisely kept the patient under continuous observation until he felt quite certain one way or the other. Although many thought that a large number of persons under treatment for glaucoma would come to be examined, only a small number did actually receive the examination.

Discussion

From the outset the many variables which enter into making a diagnosis of glaucoma were fully appreciated. Among these are instrument or operator error; elevations incidental to the excitement of the procedure, especially after standing in line for several hours; and the usual diurnal variations. We were faced with the alternative of continuing to wait until the people presented themselves with obvious signs of glaucoma or of doing the best that we could with what was available to us. We chose the latter. We were primarily interested in finding unknown glaucoma and not in statistics, and in discovering whether there are not better methods of finding glaucoma than by taking six years to examine 10,000 people, as was done in Philadelphia.

TABLE I

Number of people tested....	12,803
Number with elevated tension, one or both eyes....	1,635
Number proved to have glaucoma.....	240
Borderline.....	23
Per cent of total proved positive.....	1.87
Number unreported.....	307
Previously known glaucomas.	23

It was impossible to compel each oculist to use a standardized tonometer. However, at University Hospitals, through the kindness of Dr. Elmer Ballintine, every tonometer could be checked mm. by mm. against a known accurate scale. Some instruments tested were very poor and the owners were so advised.

In taking over 12,000 tensions in eight hours we knew that there would be operator error; and yet, when the results for the total number of right and left eyes were plotted, we were surprised to find that the distribution of tensions for each eye was almost a duplication of the Philadelphia study, in which it was possible to take con-

TABLE II

Number positive	240
Male	74
Female	166
White	193
Negro	47

siderably more care in doing the measurement.

From a medico-social viewpoint it was interesting to note that many persons not able to afford private medical care contacted the Society for the Blind upon receiving a letter which urged that they be examined more thoroughly, to inquire how they could be admitted to a free clinic. This indicates a need for continuing education by health education groups and hospitals to inform people how this care can be secured.

Of the 1,635 suspects it has been impossible to obtain a final evaluation in 307 as shown in Table I. These persons have either refused to be re-examined or are still in the borderline group. Hence, the over-all 1.87 per cent of positive subjects would undoubtedly reach the 2 per cent level if all of the suspected persons could be accounted for.

Table II shows a heavy preponderance of positive females. This undoubtedly was because during the survey hours much of the male population was at work.

In Table III one notes that 100 out of the 240 subjects were 66 years of age or over. This may have been influenced by the fact that every individual in the city receiving Aid for the Aged received a personal letter urging him to take advantage of the survey.

The reaction of the general public to the survey was most enthusiastic. Many letters were written to the committee expressing appreciation for the opportunity to be tested and for the time given by 59 oculists to this free test. Particularly appreciative were those persons who were found to have proved glaucoma and yet had been unaware of their condition. In no instance did a suspect who on more thorough testing was found not to have glaucoma express any resentment over the time and expense entailed in the more complete examination.

Conclusions

1. The Cleveland Survey figure of approximately 2 per cent incidence of undetected glaucoma in adults is in agreement with the Philadelphia Survey.
2. Mass city-wide surveys are not the best means for early glaucoma detection because:
   a. Only a small segment of the population can be examined.
   b. The large turnout of people leads to an increase in errors.
   c. The method is too expensive.
   d. The program should be continuous and not sporadic.
3. There are not enough oculists to examine every adult. Many ocu-

TABLE III

Age Distribution of Positive Subjects

Under 40	3
40–44	17
45–50	36
51–55	29
56–60	29
61–65	26
66–70	43
71–75	32
76 and over	25

lists do not use their tonometers as much as they should, and more than half of the adult population gets its eye care through non-medical specialists who by law are not permitted to take tension.

4. It might be advisable to have the measurement of intra-ocular tension become part of every complete physical examination carried out by internists, general practitioners and industrial physicians. The authors are in full agreement with Berens,[3] Gundersen,[4] and Zeller & Christensen[5] who have worked in this field and who believe that the medical profession as a whole must be educated to consider glaucoma as another medical disease for which they must be on the lookout as much as for heart disease or cancer.
5. As a result of the one-day Cleveland Glaucoma Survey 240 persons are now under treatment for glaucoma who did not know they had the disease prior to November 4, 1953.
6. The program to keep people interested in the early detection of glaucoma should be a year-round one.

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ACKNOWLEDGMENTS

We are indebted to Harold T. Clark, who served as Chairman of the survey, and to Mrs. Kelvin Smith and Mrs. George S. Case, Jr., of the Cleveland Society for the Blind for their great aid in making this survey possible. Likewise, the Cleveland Foundation, Hanna Fund, and Mrs. J. D. Cox for generously supplying the necessary funds. The authors are also in special debt to George Badger, M.D., professor of biostatistics, School of Medicine, Western Reserve University, for his aid in the statistical analysis and punching and sorting of the IBM cards.

Visual Standards for Drivers

At a meeting in Washington, D. C., last June the Eastern Conference of Motor Vehicle Commissioners recommended adoption of the following visual standards for licensing of motor vehicle operators:

Central visual acuity of at least 20/40 in one eye, either unassisted or assisted by a lens, which may not be a contact corrective lens or a telescopic spectacle lens.

Peripheral visual field in at least one eye of 120 degrees between extremities of the horizontal meridian.

Central visual acuity and peripheral field examinations to be repeated periodically.

The need for adequate visual standards for drivers was emphasized by the results at a drivers' clinic jointly sponsored by the Greater New York Safety Council and the New York Motor Vehicle Bureau. According to an article in *Guildcraft*, of 1,211 motorists who volunteered for tests at this clinic during June, 25.2 per cent were found to have faulty depth perception, a condition which makes driving especially hazardous at night or under other conditions of poor visibility. Seven and one-half per cent of those tested had visual acuity too poor to be considered safe for driving, while eight per cent showed color blindness.

OPHTHALMOLOGIC FRONTIERS IN INDIA

WILLIAM JOHN HOLMES, M.D.
Honolulu

Some progress has been made in combatting the serious eye diseases that afflict hundreds of millions of persons in India. The establishment of an ophthalmologic center and a central coordinating committee in that country is suggested as a fundamental approach to the problem.

ACCORDING to a report by the Surgeon General of the Government of India, eye diseases rank second (next to malaria) among all the diseases that affect the 360,000,000 inhabitants of that country. With few exceptions the majority of these are preventable or amenable to treatment.

Trachoma Still Prevalent

Trachoma still rages with great intensity in India, as in other poor and underdeveloped countries. It affects hundreds of millions of people of both sexes, at any age, and leaves incalculable economic, political, and social damage in its wake. It is a disease of poverty, ignorance, and promiscuity. More even than typhoid it is a disease of dirty hands. Infection is transmitted on the streets, in the markets, in public conveyances, in hotels and homes. It recedes when it comes up against personal hygiene and the installation of running water.

Trachoma is both preventable and curable. An expert study group appointed by the World Health Organization reported that the treatment of existing cases was the fundamental approach of prophylaxis. It matters little whether the therapeutic agent employed is terramycin, penicillin, sulfonamides or others. What does matter is that on completion of treatment the conjunctivae become free of inclusion bodies, that the patient be rid of his symptoms, and that he may resume his place in society without endangering family, friends, or neighbors.

Though a great deal is known about trachoma, there are still many important questions that remain unanswered. For example: Are children more susceptible than adults? To what degree are infectivity, clinical development and duration of the disease affected by ocular traumatism, or by superimposed infection, epidemic conjunctivitis and the like? Are there persons who are partly or entirely resistant to the disease? If so, why?

High Incidence of Cataract

The incidence of cataract in India has been reported to be higher than anywhere else in the world. Nevertheless the etiology of the disease remains obscure, and beyond such well known cataractogenic agents as the intensive heat and glare of the sun and possibly congenital factors, no new authenticated theories of significance have been advanced during the past 50 years. Protein, vitamin and mineral deficiencies are bound to play a role in the pathogenesis of cataracts in a country where food shortages have

existed for generations. Unfortunately not enough is known about their exact function specifically to implicate a single one, nor is there yet any effective prophylaxis.

Each year approximately 100,000 cataract operations are performed in India. If each patient with an operable cataract had his lens removed, this figure would climb to an estimated 500,000 operations yearly. It is small wonder that the Indian ophthalmologist is the most accomplished cataract surgeon in the world. During "cataract season"—in most areas from October to March—as many as 20 to 30 cataract operations are performed daily in the eye wards of most general hospitals. At temporary village eye camps where mobile ophthalmic units call from time to time these figures are even higher. In spite of what often appear to be primitive conditions, especially at the village eye camps, the end results are surprisingly good.

Other Common Diseases

Acute episodes of glaucoma as well as various chronic forms of glaucoma are rather common in India. A special type of the disease, known as epidemic dropsy glaucoma, occurs in a large proportion of the population in some districts. This is due to the toxin of an alkaloid isolated from argemmon seed oil used to adulterate mustard oil.

Surgery on the extraocular muscles is rarely practiced in India. One of the chief reasons for the lack of interest in strabismus and other types of cosmetic surgery among Indians lies in their religious beliefs and philosophy. For the most part they accept and are satisfied with their own appearance and will not take steps to alter it. However, Western influence has in a few instances broken down some of the age-old barriers and opened the door for squint surgery.

Keratomalacia, smallpox, syphilis, tuberculosis, leprosy, ophthalmia neonatorum, neglected foreign bodies, and ulcers of the cornea are responsible for an appallingly high incidence of corneal opacities and anterior staphyloma. Some of the factors that contribute to these often needlessly blind eyes are the frequent coexistence of chronic purulent dacryocystitis, poor nutritional status, severe avitaminosis, apathy, ignorance, and poverty. According to Major M. M. A. Dubash of Bombay, tens of thousands of patients in this group could have their sight improved through the operation of corneal grafting. Preliminary steps for the establishment of regional eye-banks have already been taken and reported by Dr. Mohanlal, of the Gandhi Eye Hospital at Aligarh, and Dr. Mutthaya of the Government Ophthalmic Hospital at Madras.

Ophthalmologic Center

Among the many recommendations made by WHO's Expert Committee on Trachoma was the establishment of an ophthalmologic center for trachoma control—a training station for prevention, treatment, research, and dissemination of information on the disease. Eventually such a center might become the focal point for the prevention and treatment of other than infectious types of eye diseases and might emerge as a Far Eastern institute of tropical ophthalmology.

A good example of the scientific coordination that may be achieved through such a center is the famous Giza Memorial Ophthalmologic Laboratory in Cairo, which each year

publishes and distributes valuable scientific reports throughout the world.

Professor Matthieu-Jean Freyche, secretary of WHO's Expert Committee on Trachoma, first called attention to the value and desirability of coordinated research. He made a plea for exchange of personnel, material, and methods from laboratories the world over, and recommended that periodic symposia be held. Certainly many mutual benefits would accrue from the exchange of personnel between India and the U.S.A.

Progress Has Been Made

In India the extension of ophthalmologic services to the remotest villages has already been started through the traveling village eye camps. What is lacking is more equipment and more personnel. The exchange of personnel has been on a practical footing for some time under the Fulbright Plan but very few ophthalmologists have had the opportunity to avail themselves of it. WHO has taken some steps toward eradicating at least one communicable eye disease—trachoma. However, as keratomalacia cataract and other blinding eye conditions do not properly fall within the domain of public health, WHO has not included them in its agenda. Various U.S. universities and medical schools have taken steps to "adopt" a Far Eastern university. In some instances, they have successfully exchanged staff members from several departments. However, so far, to my knowledge, this has not included the department of ophthalmology and has not included India. Independent foundations, service clubs, and isolated hospitals and clinics in the U.S. have made it possible for a few Indian students to obtain scholarships.

Central Coordinating Committee

It has been recommended that a central competent coordinating committee composed of U.S. and Indian and possibly other United Nations members be formed. Such a committee could, within the present framework, greatly augment the existing facilities, provide new opportunities, and lay the foundation for the proposed ophthalmic institute. Several of the large U.S. foundations have helped India in many other respects and might get behind this plan as well. They and a great many other private organizations are generously backing ophthalmologic research in this country and might be willing to extend the support beyond our own national boundaries. Various universities interested in improving and expanding their ophthalmologic postgraduate and research facilities might be willing to set aside funds for the support of an ophthalmologic institute with which they had a close affiliation. Drug houses and surgical supply companies doing business in India might find it to their advantage to assist in the development of such a plan.

Under the Point Four program a great deal of financial and technical help has already been channeled to India. U.S. sponsored mercy missions having the restoration of eyesight and the prevention of blindness as their sole purpose may be of incalculable value. If by humanitarian acts and deeds we can show the peoples of Asia that we are willing and ready to help them, we will have made an important contribution toward strengthening ties between Asia and the Western World.

IF VOLUNTEERS QUIT

The late Dr. Eduard A. Lindeman, eminent sociologist at Columbia University, dreamed that all the volunteers in various organizations in America quit. The story as he told it is reprinted from *Scouting Magazine*, January 1954.

WHILE I mused, I imagined that on a certain hour of a certain day all of the volunteers in America went on strike. They all decided to quit. Not another meeting. All stayed home. I tried to estimate how many there would be. At that time, which was some four or five years ago, the estimate was about twenty million. There were then, I assumed, about twenty million citizens who day in and day out gave of their time and energy without any recompense on behalf of the health, welfare and educational institutions of their community. And so they all went on strike. And then I allowed my imagination to wander. What would happen? What events would take place if all of the volunteers quit suddenly?

I don't know how your mind would work in this connection, but mine led me to the conclusion that within six months we would become a dictatorship. Within six months all of our free institutions would be gone. All of our activities would be now subsumed in some form of bureaucratic officialdom. Nothing would be left for the uncoerced individual to do. He would have no task to perform.

I really believe that we would lose our democracy. Maybe not in six months. My time schedule was perhaps a little accelerated. But certainly, within a definite period of time, without any opportunity for the free choice of individuals, citizenship, democracy and freedom, I am sure, would disappear.

Never was it more important that we assume such obligations. We happen to have reached one of those periods in history when the complexity of the problem far outruns the available leadership.

When this sort of situation prevails, the problems and complexities seem to outrun the resources and you get a kind of negativism, in which nearly all of the descriptive phrases used about our society are couched in negative terms. Mr. Toynbee calls this the Age of Trouble. The psychiatrists call it the Age of Anxiety. Four recent books were published in New York, all of which have the word "fear" in the title. Some moralists describe it as the Age of Corruption. Religionists often refer to it as the Age of Disbelief, or the more popular word now is the Age of Secularism.

These are all negative terms, and obviously man cannot live by negation. If I were asked to give a recipe to people who want somehow or another to find a way out of negation, I would say "volunteer." Find something to do in relation to human welfare.

We expect people in a free society to engage in this kind of activity because they really care about what happens to people. That means they are re-

sponsible citizens. That is what the word "responsible" means. It means "capable of responding to need."

In a society where there were not a preponderant number of citizens who really cared about what really happened to people there would be no sense in freedom. There would be no demand for freedom at all.

The second reason we expect people to volunteer to participate as citizens in the work of human welfare is because we want them to demonstrate their belief in the principles of voluntarism. I don't believe you can have a free society unless you have a large number of activities which are uncoerced and function outside of bureaucratic control.

Belief in voluntarism is not necessarily an indication that you disbelieve in government. But it does mean that there must be, for all governmental activities, some voluntary counterpart. It was the French philosopher, deTocqueville, who stated that the health of a democratic society may be measured in terms of the quality of functions performed by private association. Not the quantity. The mass quantity problems are not going to be solved by private association. But the quality is measured by what is done by the uncoerced free people.

The third reason we ask for volunteers on a wider scale is that we must find some way of bringing about a coalescence between the two great forces—namely democracy on the one hand, and science on the other. And how to do this, it seems to me, is the major task of democratic peoples.

If then, the volunteers were to disappear from American society, if men were to cease, either from necessity or from choice, to exercise their right to have active roles in the life of their community, then only the shell of democracy would remain. When men have surrendered the right to give of themselves, their money and their time, generously and voluntarily, to the causes dear to them, the heart of a free society has ceased to beat.

APPOINTMENT OF MARGARET ANNE McGUIRE

Margaret Anne McGuire, career woman in public service, has been appointed director of the Commission for the Blind, New York State Department of Social Welfare. Miss McGuire was chosen from a competitive civil service list to fill the vacancy left by the resignation of her predecessor, Ruth B. McCoy, who has accepted a position as executive assistant to the president of the Albany Association of the Blind.

Miss McGuire has had twenty-five years' experience in social work. She has served as a social worker and executive in local, state, and international fields, as a former deputy commissioner of the New York City Department of Welfare, and as a university instructor.

During the last seven years she has been in charge of the social welfare examination unit of the State Department of Civil Service. Her previous state service included seven years with the State Department of Social Welfare in various supervisory social work positions in the department's New York City office.

EYE SAFETY FILMS

The National Safety Council's directory of safety films lists 963 motion pictures and slidefilms, both sound and silent, for safety education within business and industry, on the farm, in the home, and on the streets and highways. About 20 films on eye care and protection are included. Inquiries may be addressed to the Council at 425 N. Michigan Avenue, Chicago.

OPHTHALMIC ASPECTS OF READING DISABILITIES

RALPH O. RYCHENER, M.D.

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Sympathetic understanding must be the dominant factor in teaching the child to overcome a poor reading habit. A coordinated plan of instruction that usually brings excellent results can be worked out by teacher and parent.*

ONE of the peculiar problems which the ophthalmologist frequently faces is the child of early school age who has great difficulty in learning to read. In desperation the teacher asks for an eye examination in the hope that glasses will relieve a defect which is congenital, frequently associated with left-handedness and mirror reading and/or writing.

This condition is an alexia or word blindness in which patients with normal vision cannot seem to understand written or printed language. The region of the visual memory center is situated in the angular or supra marginal gyrus on the left side of the brain only, this latter point having been determined in cases of acquired alexia due to cerebral tumor, abscess or hemorrhage. This fact has led to an interesting theory of congenital word blindness advanced by the late Dr. S. T. Orton, former professor of psychology at the University of Iowa, who stated that "visual records of only one side of the brain are used in symbolic association. Yet the inactive side is as well developed as the other. This would leave some record in the cells of the inactive side which would be opposite in sign and would form a mirrored pattern." May it not be then that while normally only one of these patterns is in activity, in these abnormal cases under consideration the habit of suppression of the other has not been established; hence, the difficulty in differentiating between "p" and "q" and "d" and "b", "was" and "saw", and the tendencies to mirror reading and mirror writing which he found in his cases to be characteristic of the condition?

In our office such patients receive a routine cycloplegic refraction and ophthalmic examination, glasses for reading being prescribed only if there is a frank refractive error of at least one

* A paper presented at the Annual Conference of the National Society for the Prevention of Blindness, St. Louis, Mo., March, 1954.

diopter. In addition, an examination is also made in the orthoptic clinic where the eye movements while reading are recorded on a film by the ophthalmograph. This is then analyzed with regard to the number of words covered per minute, the fixations and regressions per hundred words, the span of recognition and comprehension of the material covered. This is then compared with the normal ratings for the patient's age and the following report is sent to the parents.

Dear Mrs. .....:

The analysis of .....'s reading graph has been completed and I feel that I can now more fully advise you as to the correct approach to .....'s reading problem. You will be interested in the findings of the ophthalmograph test made:

Findings	Norms (.....) Grade
.....	Words per minute .....
.....	Fixations per 100 words .....
.....	Regressions per 100 words .....
.....	Span of recognition .....
.....	% Comprehension .....

By comparison with the norms set up for .....'s age and grade there is quite a discrepancy in reading speed. You will see that the great number of fixations and regressions made are contributing factors. I would like to point out, however, that underlying this poor reading habit are probably various causes such as an inadequate idea of phonics, extreme carelessness in pronunciation or a faulty sense of discrimination between letters of similar appearance.

I would stress that this particular problem be handled in a way that would cause the least embarrassment to the child. Placing the child in a position that would bring on the ridicule of other children is a mental insult and should be avoided. More important than actual methods is the maintaining of a wholesome attitude of fairness toward the child—an attitude that will promote his mental health.

A coordinated plan of teaching can often be worked out between teacher and parent; the teacher, on the one hand, encouraging the child in his work at school with understanding and with as little embarrassment to him as possible; and the parent, with the summoning of unlimited patience and constant urging, working daily with the child during a regular study period.

General suggestions that may be followed are:

1. If a child is lacking in the ability to recognize the sounds of letters, training in phonetics should be most helpful. This kind of drill can easily be made a game and should not be neglected.

2. If the child's reading is done in a careless manner with a tendency to slur sounds of letters and change word endings, or to read words in reverse, slow, careful pronunciation will have to be taught before work can be done on reading speed. The encouragement, at first, of exaggerated lip movements will help develop careful pronunciation.

3. Do not form the habit of spelling a mispronounced word to a child and do not let the child form the habit of spelling words to himself before pronouncing them. This will decrease reading speed and encourage too great a number of fixations and regressions. Help the child practice pronunciation of difficult words either by syllables or by the word as a whole. Words that are frequently mispronounced may be taught in several ways:

a. The kinesthetic or tactile method is often helpful. The word may be written on a large piece of paper and traced over and over with the first finger while the word is repeated slowly. After several tracings the word should be written again and again, the word being covered after each writing so that copying is not possible.

b. It is not always necessary to resort to the tracing method. The word can be carefully pronounced over and over and then written several times from dictation—not copied.

A list of these emphasized words can be kept and reviewed at intervals. They can be incorporated in dictated sentences and paragraphs. They can also be practiced by having the child rewrite a story in his own words.

4. The interest and enthusiasm of the individual child are important factors in the amount of speed of progress made. For this reason it is usually helpful to use reading material that is slightly below the required standard of the child's grade. If the reading of interesting simple material is encouraged, a better liking for reading as such is often promoted, and some speed may be gained. This in turn is encouraging to a child who may be developing a feeling of inferiority and frustration where reading for any purpose is concerned.

5. It is important to keep check on the comprehension of material read silently. Children who find reading difficult not only fail to comprehend fully what is read but often form the habit of calling upon their imagination to fill in what they fail to grasp. Very often a complete story, very foreign to the original one read, will be retold, based on scattered recognized words. An experience of this kind emphasizes the need for *careful* reading as a prerequisite to rapid reading.

The necessity for *early* encouragement of a poor reading habit should be stressed. Wrong attitudes about learning in general, and particularly concerning the teacher in charge, can develop very quickly and cause much inner tension. The feeling of inferiority mentioned earlier can grow with alarming speed and often causes distressing situations if the reading problem is not recognized and coped with adequately.

Above all, however, it should be borne in mind that sympathetic understanding must be the dominant factor in any teaching that is done. This understanding must preclude any embarrassment of the child. He should not be made to read aloud in class nor in any way be made to feel his inadequacy before other children. He must be enabled gradually to build up confidence in his own ability as he de-

velops a better habit of reading. The maintaining of a wholesome attitude toward a poor reader who is seeking help is a prerequisite to any progress that one may hope for by means of the best teaching methods.

In order to maintain his place in the other studies of his class, these lessons should be read to him by teacher or parent since these individuals with reading disability quickly grasp such information by auditory methods. Most of them have better than average ability in mathematics and manual dexterity, and these abilities should be praised and encouraged. Not every youngster is potential college material, but every one should be encouraged to fill his particular niche in life to his best ability. Many of our poor readers have made wonderful successes in the fields of business, engineering, etc.

Sincerely yours,
RALPH O. RYCHENER, M.D.

Clinic Training

For those who can visit the orthoptic clinic several times weekly, valuable aid can be rendered by reading training with the metronoscope. Those at a distance can be aided by the suggestions outlined in the letter. A bibliography of books and monographs on the subject is also supplied the parents and most of them profit by the purchase and use of this material.

Where the defect is very great, one may have his lessons read to him by another normal student in the same classes. One of my patients was in this manner enabled to finish high school and the University of Arkansas because his best friend had similar aims and they carried the same courses at both institutions.

This condition should be recognized early, treated sympathetically, and is one in which the ophthalmologist has a grave responsibility. He can lift many of these youngsters from the morass in which they are mired through no fault of their own and can aid them to become useful members of society.

SUGGESTED READING:

Remedial Reading
by Monroe and Backus
Houghton Mifflin Co., Chicago

Children Who Cannot Read
by Marion Monroe
University of Chicago Press

Mental Measurement Monographs
Serial No. 11
On Certain Disabilities—Their Nature and Treatment, by Grace M. Fernald
Williams and Wilkins Co.,
Baltimore, Md.

Uveitis Study

A study of causes and treatment of uveitis is being made by Drs. Ralph W. Ryan, William M. Hart and John J. Culligan, eye specialists of the National Institute of Neurological Diseases and Blindness at Bethesda, Maryland. Inflammation of the uvea, or colored tissues of the eye, causes approximately one-fifth of the cases of blindness in the United States. It is one of the few common diseases that medical science has made but little progress against until recently.

A report of this investigation is to be given by Dr. Ryan at the annual meeting of the American Academy of Ophthalmology and Otolaryngology in New York in September.

THE NURSE AND THE VISION PROGRAM IN INDUSTRY

MARGARET L. STEELE, R.N.

Superintendent of Nurses
American Brake Shoe Company, Chicago, Illinois

In American Brake Shoe Company's many plants a large staff of nurses make a vital contribution to eyesight conservation—through employee education, vision testing, first aid, attention to individual problems and constant vigilance.*

AMERICAN Brake Shoe Company has 58 plants, most of which are foundries. They vary in size, the largest having approximately 500 employees, the smallest about 30. Forty-two nurses cover 50 plants which are scattered from coast to coast and from Canada to Texas. The other eight are not large but we hope to have part-time nursing services for them before long. Though our plants are widely distributed and our products diversified, our program for eye care and sight conservation is uniform throughout the company. I shall touch only briefly on that aspect involving the use of safety goggles. I cannot omit it altogether since the industrial nurse can contribute much to this part of the program.

In Brake Shoe plants safety goggles must be worn even by visitors. Of course, some employees complain about wearing them; some take their goggles off when they think no one is looking and others wear them on the ends of their noses. The industrial nurse can be helpful in explaining to these individuals the reasons for using goggles as well as the proper way of wearing them. Her part in such education is important particularly in those small plants where there is no safety director.

For demonstration purposes some of our nurses keep on hand a pair of safety goggles with a lens that has been shattered in an accident in which the eye was not injured. Such examples are potent factors in indoctrinating employees in the "whys" of wearing safety devices.

Recently our company became a member of the Wise Owl Club. We realize the great importance of properly maintained eye safety equipment and of a continuing educational program among our employees as to its use. However, this is only one phase of

* A paper presented at the Annual Conference of the National Society for the Prevention of Blindness, St. Louis, Missouri, March, 1954.

our nurses' responsibility for vision conservation.

Visual Acuity Tests

Before an applicant is hired he is given a complete physical examination, including a visual acuity test. Only the near and far reading charts are used at this examination, and we rarely miss the man who needs prescription glasses. We realize that certain instruments for testing vision provide additional information but they are not always practical or necessary in small plants. We insist that applicants who experience any difficulty in reading the charts have their eyes checked by a competent doctor. If correction is indicated, the company supplies the employee with prescription safety glasses.

Usually people of working age know if they have some visual defect, but this is not always true. Recently a young man applied for a job in one of our plants. He was alert, apparently in good health and did not show any evidence of poor vision. Yet when the nurse tested his eyesight she found only 20/200 in one eye and 20/60 in the other. The applicant was completely surprised as he had been totally unaware of the defect. When he was provided with proper glasses he expressed his amazement and pleasure by saying, "Gosh, the world seems so much brighter now!"

If an applicant is already wearing glasses we question him as to where and when they were purchased. We have found some individuals who bought their lenses in a "Five and Ten." Some were wearing their wives' glasses; others had not had their eyes examined for years. Since a prescription is necessary to order safety glasses it is usually not too difficult to get these people to an oculist.

Periodic Check-Up

In addition to preplacement examinations our employees have periodic physical check-ups every two years. In some of these we find that defective vision has developed since the previous examination. One employee when hired had vision of 20/25 in the right eye and 20/30 in the left. Two years later his vision was 20/30 and 20/100 respectively. He admitted to the nurse that when he got in his car and started down the road he hoped no one was in his way. Yet he had done nothing about it! She persuaded him to see a doctor and his vision was corrected to 20/20 in each eye.

Another employee had been wearing prescription glasses for a number of years. During a routine periodic physical examination it was found that vision in his right eye was unchanged but that in the left eye it was almost gone. He had not noticed the change. The eye physician found a cataract, which was treated successfully.

Importance of First Aid

Even though we insist that all employees wear safety goggles, more visits are made to our first aid rooms for treatment of eye conditions than for any other type of injury. (An exception is accidents involving the hand and arm.) We are not ashamed of this statement for two reasons:

First, very few of our eye cases need more than routine first aid care. Most of them involve foreign bodies that are easily washed out or have been removed by tears before the employee has reached the first aid room.

Second, it is indicative of our con-

tinuing campaign to get employees to report all minor injuries and eye complaints at once. As I mentioned before, most of our plants are foundries in which grinding operations are not uncommon and the use of sand is part of the manufacturing process. We have found that if any employee reports to the first aid department as soon as he feels something in his eye the foreign body can usually be washed out, but if he delays it will probably become embedded.

Through these visits the nurse has her greatest opportunity to educate employees in the use of safety goggles. A workman may get a foreign body in his eye because his goggles do not fit properly. If there is a safety director in the plant the employee is referred to him for fitting. If not, the nurse herself will make the adjustments.

Emergency Care

If we industrial nurses did nothing about eye conditions except at the time of physical examinations or when injuries occur we should be most derelict in our duty to employees. All reported eye conditions are not occupational, but still we give emergency care and refer affected workers to their own doctors. In one of our plants an employee reported to the nurse that his eye "just didn't feel right," and he wanted her to administer some eye drops. There was no history of an injury and she could detect nothing unusual. It was Friday, so she suggested that he see an eye specialist the following day. On Monday the employee told her that there was "a scum" over his eye but he had not seen a doctor because he was short of cash. The nurse arranged a small loan and sent him immediately to a doctor who diagnosed the condition as glaucoma. The employee was treated and is now back at work on a job compatible with his vision.

On Monday morning in another plant an employee reported that while at the movies the previous Saturday "it suddenly seemed as if a flag dropped" over his eye. The nurse applied a dressing and had the man taken to the eye specialist right away in the company car. He had a detached retina. Following successful surgery the employee returned to his former job.

Errors in refraction are also picked up during visits to the first aid room. This is particularly true when an employee who has been a rare visitor begins to come in frequently with injuries. Often the nurse will find that the increase in accidents is due to defective vision. She of course refers him to the oculist.

Family Problems

In the American Brake Shoe Company we are not concerned with the employee alone. We are interested in his family, too. We make home visits when employees are ill or injured and occasionally to see a member of the family. During one such visit the nurse noticed that a little boy had trouble focusing one of his eyes. She was very much surprised that the mother had not observed it and was unable to do so even when it was pointed out to her. Nevertheless, the mother agreed to take the child to the clinic. He was fitted with glasses and exercises were prescribed. His vision is almost normal now.

Quite a number of employees' children with strabismus were not treated until our nurses used their influence

with the parents. We even had one seventeen-year-old girl who had never been examined. Her father was sure she was too old to be helped. The nurse finally persuaded him at least to take the girl to a specialist. Surgery was necessary to correct the condition —but think how much happier that girl is now!

After Retirement

Going to the other extreme in ages, consider our retired employees. One of these men began to have trouble in one eye just before he stopped working. The disease was diagnosed as glaucoma, but treatment was refused. Two years later when his eye was giving him constant pain the nurse was able to persuade this man to enter the hospital. The company helped him financially and the eye was removed. True, he lost an eye, perhaps unnecessarily, but at least he is now free from pain and again able to read.

Sometimes we are not even as successful as this in conserving the sight of an employee or a member of his family but nevertheless we do what we can to help. The wife of one of our men gradually lost her sight, apparently because of long-standing diabetes. Since her husband is still working, she is not eligible for benefits from the State Division for the Blind but he will retire in another year. With the nurse's help the case has already been set up and the wife's benefits will start when the employee does retire.

In another of our plants, where the nursing service is fairly new, the nurse found that three of the retired employees are blind. Since their pensions are small she is helping them apply to the Bureau for the Blind.

I have cited only a few cases in which we have been instrumental in protecting vision and helping those who unfortunately have lost it. These are not isolated instances. Nurses truly appreciate how precious and irreplaceable is one's eyesight. We are proud of the job they are doing in this field of endeavor.

Gesell Institute of Child Development

The following letter appeared in the *Journal of the American Medical Association*, April 3, 1954. It is reprinted here with the permission of the editor and of Dr. R. M. Fasanella:

To the Editor:—Among the articles appearing in a syndicated newspaper column called "Child Behavior" and coming from the Gesell Institute of Child Development is a series regarding the treatment of myopia by exercises. It might seem obvious that the published articles do not represent the views of the section of Ophthalmology of Yale University School of Medicine, but because the Gesell Institute is located in New Haven, Conn., we have been receiving from colleagues, even within the state of Connecticut, inquiries as to why we permitted such articles to come from Yale University. I wish to call attention to the fact that the Gesell Institute is a private organization, with no connection with Yale University, and that the Yale University School of Medicine has no control over, and does not necessarily sanction, any article coming from this Institute.

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Next Year's NSPB Conference
March 16, 17, 18, 1955
Hotel Statler, New York, N. Y.

Report of a Workshop on Meeting the Needs of Partially Seeing Children in Rural Areas

TWO sessions of this workshop were held at the Annual Conference of the National Society for the Prevention of Blindness in St. Louis, Missouri, March 10 and 11, 1954.

The chairman was Mrs. Dorothy Bryan, assistant director of education of exceptional children, blind and partially seeing, Illinois State Department of Public Instruction, Springfield.

Greetings were extended by Richard S. Dabney, director, Division of Special Education, Missouri State Department of Education.

Members of the Resource Panel were: Mrs. Amie Dennison, teacher, Nashville, Tennessee; Evelyn E. Eisnaugle, supervisor, Orthopedic and Partially Seeing, Ohio State Department of Education, Columbus; A. LeRoy Taylor, director, Division of Special Education, Oklahoma State Department of Public Instruction, Oklahoma City; A. G. Thompson, supervisor, Special Education, Arkansas Dept. of Education, Little Rock.

Existing Facilities

According to the most recent information there are facilities for education of partially seeing children in 672 centers representing 248 cities, 36 states, the District of Columbia, and the Territory of Hawaii. Of the estimated 60,000 children needing such educational opportunity, some 8,000 are now receiving special help.

Practically all existing facilities are in urban areas; very little has been done in rural ones. Since most of the people at the conference came from sections of the country having large rural areas, the subject for this workshop was very timely.

According to the definition used by the National Society for the Prevention of Blindness a partially seeing child is one who has a visual acuity of 20/70 or less in the better eye after the best possible correction and who can use vision as his channel of learning.

State Programs Outlined

Legislation in the different states varies. At the first workshop session each consultant gave a brief summary of his or her state's pattern, together with a report on existing facilities.

In Tennessee legislation is permissive, with a state board to interpret the law and the state superintendent of education forming the policies. Counties meeting requirements can receive $500 per teacher position and up to $1300 for equipment and other needs. There are approximately 1,400 partially seeing children in the state. Nine special classes established in urban areas care for 135 of these. Others are given help on a service basis with large-type books and mate-

rials provided. Three regional supervisors spend part time on this program upon request from the local schools. The greatest present needs are: (1) awareness on the part of classroom teachers and school personnel so that partially seeing children will be recognized and service sought; and (2) trained teachers in this field.

Ohio was one of the first states to provide facilities for partially seeing children. To care for those from rural areas boarding homes were provided and transportation arranged so that the children could attend established classes in towns and spend the weekends at home. Yet with regular class and traditional type programs numbers decreased until the itinerant teacher plan was initiated.

The child's near vision is considered; many can use small type; the permissive classroom atmosphere allows the child to work to capacity. The itinerant teacher explains the child's eye condition, interprets his needs and gives him the additional help he requires.

Four such programs have proved successful. Parents are willing to have children cared for in this manner, and the children keep up to grade level. Referrals have increased and enrollments are so large that the teacher load needs reduction. The problem now is to find more trained teachers. Last summer Ohio State University's course for teachers of the partially seeing included training in the three types of educational facilities for such children.

Oklahoma's estimated number of blind and partially seeing children is 1,000. Forty of the partially seeing are being educated at the State School for the Blind and five classes have been established in the two largest urban areas. Recent legislation permits the use of funds to care for exceptional children in regular classrooms through provision of large-type books and materials. This is felt to be a step in the right direction even though it is not an adequate service. A permissive clause in the law will make it possible to establish an itinerant teacher program with cooperative special educational units. The sum of $2,500 per teaching unit, plus 6 cents a mile for transportation or full fare by common carrier is available. The pressing problems are: (1) an adequate discovery plan so that accurate figures may be used in planning; and (2) a teacher training program.

Arkansas with its very small urban areas has no traditions to break down in providing for its partially seeing children, since until recent years there has been no legislation to care for them. The first law was passed in 1947. The estimated number of partially seeing children in the state is 900; this coincides with the 1951 survey made by the National Society for the Prevention of Blindness which found 850. The permissive law allows flexibility of interpretation and in 1950 a State Sight Conservation Committee was formed. This was composed of representatives of agencies, the PTA and professional groups. Plans for a state register of partially seeing children were made, and the register was established in the Division of Instruction, State Department of Education. An ocular report form has been worked out; letters are sent to school administrators and followed up by nurses from the State Department of Health. The committee reviews reports and tries to plan for the chil-

dren on the register. The State Library, interested in the needs of partially seeing children, has agreed to furnish large-type books for supplementary reading and to give teachers explanation of type size. Large-type textbooks may be purchased with local school funds. The immediate needs are: (1) awareness of need; (2) teacher training; and (3) adequate financial provision.

Reasons for Slow Development

Following these summaries by the consultants the first question posed was: Why have rural services been so slow in developing? Possible reasons included inadequate screening and discovery, lack of funds, lack of trained teachers, and, most important, the fact that the traditional and regular class plans cannot function in rural areas. It was agreed that the itinerant teacher program could meet such needs and that certain services from the state level could be effective until such programs were started. These would include provision of large-type books and other materials; help for classroom teachers through correspondence; visits by a supervisor; printed and mimeographed information; and work through the county offices and general supervisors, such as elementary school supervisors.

Consideration was given to steps a state having no program for partially seeing children in rural areas would need to take. In some cases there would be necessity to revise the law; in others the law is sufficiently permissive to cover the needs. Use of the itinerant teacher plan would mean a change in the over-all philosophy and methodology. Need for careful interpretation of the program is obvious.

Considered of utmost importance were the need for discovery of these children and adequate reporting and record keeping; also in-service training of classroom teachers and proper training of the special teachers.

Appraising Local Needs

The second day of the workshop dealt quite naturally with an attack on the problems raised the first day. As to the discovery of partially seeing children, it was agreed that each community's plan should be geared to fit the local situation. The need for winning the interest and cooperation of all concerned with these children was recognized. There are times when the special teacher needs tactfully to steer the work, if screening and follow-up is to be accomplished successfully. In working with nurses and other teachers the children with multiple handicaps will receive needed attention. No vision screening will be effective without proper recording and follow-up.

Classroom Teacher is the Key

Work for partially seeing children cannot reach maximum success without the understanding and help of the classroom teacher. In the itinerant teacher program she is the key person. The question was raised as to whether some survey course on work with exceptional children could not be made mandatory. Those present felt that such a plan would not be feasible. Instead it was suggested that stress continue to be placed on meeting individual needs of all children and that attention be given to the attitudes of teacher training institutions. Once they understand and recognize individual differences the work with all types of exceptional children will be

included in all their courses offered. Examples of in-service training showed that this was carried on through local, state and county institutes and workshops. Some of these last one day, others for several days.

Opportunities should be made each year to acquaint new teachers with the facilities for partially seeing children. Dissemination of information through printed and mimeographed material is recommended. Personal acquaintance with the service and observation of the children succeeding at work is the most effective argument for the work.

Carry-over from informed teachers creates community interest. Without interpretation and knowledge we cannot expect a community to lend support to any program. Carefully planned work with teachers, parents, public and private agencies, family physicians, ophthalmologists, optometrists, service clubs, etc. will develop an intelligent, enthusiastic acceptance and backing.

Teaching Experience Needed

Discussion revealed unanimous acceptance of the fact that the most successful teacher of partially seeing children is one who has a background of teaching experience before taking her special training. For the itinerant teacher program this is an absolute necessity. Such teachers need maturity, ability to work well with adults and children, and, to an even greater degree than the teacher working in a special room, all those qualities generally accepted as necessary for teachers of partially seeing children. With this in mind, it was felt that a school system is wise when it interests one of its own successful classroom teachers in taking the necessary training.

Basic Requirements

Question as to types of state certification was raised. It was found that this varied from state to state and no conclusion or recommendation regarding it was made. However, it was agreed that in preparation for teaching partially seeing children under any circumstances the experienced, qualified teacher of normal children should be given the basic requirements recommended by the National Society for the Prevention of Blindness. These are: 120 clock hours including 30 clock hours of lectures and discussion on the organization and administration of facilities for partially seeing, physical surroundings and equipment; 30 clock hours of lectures and discussion on the ways and means of conducting work in elementary and junior high schools and senior high schools, educational media and their use, principles of illumination and educational and vocational guidance; 30 clock hours of observation and participation in a well-conducted demonstration class; 30 clock hours of lectures and discussion on the anatomy, physiology and hygiene of the eye, principles of refraction, refractive errors and common eye diseases, together with observation of cases demonstrated in clinics, and individual conferences. The courses offered should include training for the traditional, regular class and itinerant plans so that a teacher is well prepared regardless of the type of program offered in a community. The training courses should be planned so that the requirements are combined and thoroughly integrated to form an intensive practicum. The students must devote their entire time to such an intensive course when it is given in summer.

Itinerant Plan Less Expensive

In discussion of the itinerant teacher program it was revealed that Ohio has found it less expensive than the other types of programs for the partially seeing. Discussion of the plan showed the need for screening and locating children; arranging schedules to conserve on time and travel; a repository of materials and large-type books from which the special teacher can provide for the needs of individual children; careful recording and sharing of information with the classroom teachers; cooperation with classroom teachers and other school personnel; work with parents and the community. Experience shows that when the child has the help of the special teacher as well as the one in the classroom his progress is very satisfactory. The child and all concerned are pleased with the plan and he is given a better opportunity to be a participating member of his school and community.

High School Program

Question was raised as to how work could be planned for the high school student. It was agreed that the itinerant teacher could work with him as well as with the elementary school child. Tape recorders and readers are found to be of even more help to the older students than to the younger ones since there is less material available in large type for the upper grades.

In discussing readers it was noted that in studies of near vision many children are found who are able to do their own reading. For those who cannot students or teachers may read aloud. When such reading is recorded the student can listen as many times as necessary to learn the details of a lesson. Talking Book records and certain commercial records may be used for some subjects.

Plan Can Succeed

In conclusion the group felt that the needs of partially seeing children in rural areas can be met. Careful planning is needed, but with this the itinerant teacher program can succeed.

There is obvious need for:

1. Proper legislation.
2. Awareness of the need by all concerned.
3. Adequate screening and discovery.
4. Careful reporting and record keeping.
5. In-service training of classroom teachers.
6. Proper training of special teachers.
7. Re-structure basic teacher education to include consideration of the individual which would mean basic knowledge of exceptional children.

NO DARKNESS

"There is no so-called 'World of Darkness.' There is not even a 'World of the Blind.' There is only a world of people who have varying and differing degrees of intelligence, opportunity and physical endowment." Frances Smith, executive director of the Fort Worth Foundation for Visually Handicapped Children, makes this statement in an article in *The Lion*, April 1954, describing the Foundation's program.

"If people were set apart on the basis of difference," she continued, "we would all end up on separate little islands. We must live together in understanding and faith, with minds and hearts open to what is in each of us to give—to what is in each of us to be."

AID TO THE DISABLED

The Research Council for Economic Security, Publication No. 99, reviews the newest of the public assistance programs, "Aid to the Permanently and Totally Disabled," established in 1950.

A table derived from "Care of the Long Term Patient" showing the characteristics of 63,632 persons rehabilitated under the State-Federal vocational rehabilitation program for the 1952 fiscal year gives some revealing statistics about this population cross section: Sixty-five per cent of the group were male; 84 per cent were of the white race; 21 per cent of those between 25 and 34 years were accepted for vocational training, and 22 per cent between 35 and 44 years. These were the largest age groups referred.

The chief type of disability at the time of acceptance for rehabilitation, 21 per cent, was due to impairments of the extremities. Visual disabilities ranked second highest, 12 per cent, and equal to two other categories, amputations or congenital absence of extremities and an unclassified group of miscellaneous handicaps. The two leading referral agencies were health and welfare organizations.

It was estimated that people who were rehabilitated during 1952 increased their earnings about 625 per cent. Projections of their anticipated earnings during their working lives indicate that those rehabilitated will pay back to the Federal Government in income taxes more than ten dollars for every Federal dollar spent on such retraining. This is sound evidence that even though rehabilitation programs are initially more expensive than relief, in the long run it is less wasteful to utilize the skills and productive capacities of the handicapped.

An interesting observation concerning the 31 per cent referred for rehabilitation who were under 25 years of age is that the exceptional child of today is often the handicapped adult of tomorrow.

THIRD RUTGERS CONFERENCE

The Third Rutgers Conference on Occupational Vision will be held in New Brunswick, New Jersey, on November 16, 1954. Ocular efficiency will be the main subject to be considered, according to John R. Wittekind, O.D., conference chairman. Tentatively scheduled for discussion are the problem of industrial seeing conditions and demands, the costs of inefficient vision, the techniques involved in accelerating perception and comprehension, and organizing and maintaining a modern vision program.

EARLY CONCEPT OF CORNEAL GRAFT

The scope of corneal grafting was the subject of the opening paper, given by Dr. B. W. Rycroft, at the section of ophthalmology, annual general meeting of the British Medical Association, in July 1953.

The idea of corneal grafting, Dr. Rycroft stated, may be said to have begun with the remarks of E. Darwin in *Zoonomia*, 1794–1796:

After ulcerſ of the cornea which have been large, the inequalitieſ and opacity of the cicatrix obſcure the ſight: in this caſe could not a ſmall piece of the cornea be cut out of a kind of trephine about the ſize of a thick briſtle, or a ſmall crow-quill, and would it not heal with a tranſparent ſcar?

This is not the earliest record of the concept of corneal grafting, but very likely the first to appear in the English language.

NSPB at Work

A THREE-CENT stamp conveys all sorts of letters, embodying good news and bad, questions and answers, plans and their changes. But the Society's incoming mail that is channelled to the medical social work consultant is of a rather special nature. Some of the letters which reach the desk of Sarah A. Butts may be neatly typed on business letterhead but many are laboriously written in pencil with the phonetic spelling so often used by people who rarely need to commit their troubles to paper. Sometimes the writers give their ages; the range so far is from 12 to 92 years.

The messages may be brief or full of detail, medical or otherwise, and even contain a few diagrams or special items by way of illustration. Among the latter, for example, were a broken lens from a pair of glasses and a piece of cardboard with "God Bless America" in two-inch letters to show the only type the sender was able to read.

The common element in all of these communications is the person's anxiety over some actual or threatened loss of sight. Many emphasize their concern with an admonition to answer "right away" or "send air mail," though from their own account the eye problem has been present for several years.

In various ways the correspondents have learned about NSPB, usually as the result of direct publicity—radio, television, newspaper and magazine releases, car and bus cards—and occasionally from friends or relatives previously in touch with the organization. Some have had excellent medical eye care but have learned that at times even this cannot restore lost sight. Such persons find that fact hard to accept and hope to discover, by some means, a magic treatment.

Many inquiries are from people in the rural areas of the United States and Canada who realize they have eye trouble but do not know how to obtain treatment; or perhaps the facilities are there but they lack money to pay for such services. Sometimes the real fear that is natural to all of us when surgery is recommended is spelled out: "Should I or shouldn't I have the eye operation? Maybe afterward I won't see even as well as I do now. What do you think I ought to do?"

Letters from adolescents are especially appealing. They dread what is regarded as the cosmetic handicap of wearing glasses and seriously inquire if blindness will result from not using them; many hopefully desire information regarding contact lenses. Oldsters reveal a stubborn resistance to the eye changes that are normal for their age and complain of the enforced inactivity to which they have been relegated by dimmed vision since they are often "strong as a horse" otherwise.

That the answering of these letters must be as individualized as possible is obvious. To offer help via a stamp has limitations for both writer and receiver, so in closing Miss Butts ordinarily suggests that if there are additional questions she would be glad to have them write again. This sometimes happens, allowing the oppor-

tunity to reemphasize points or share more information. In a number of instances people have written just to say "thank you" for the assistance.

With each reply an NSPB pamphlet of appropriate eye information is enclosed. Frequently specific local resources for eye care are mentioned if the writer asks for this. When there is indication of financial need to pay for necessary care, the name and address of the nearest public assistance agency is given. Should the applicant be found ineligible for such a program, a referral to the proper community resource can be arranged. Contact with a local prevention of blindness organization is often recommended if there is one in the vicinity. If the problem pertains to carrying out medical recommendations the correspondent is encouraged to return to his oculist and ask more specifically about diagnosis and treatment. So often patients fail to voice their doubts or formulate questions to their physician, who is really the only person in a position to supply the proper individual information.

One hopes that a prompt and friendly answer to this wide group, representing all walks of life, will help to prevent eye illness and aid in sight restoration. Undoubtedly the NSPB literature is shared with relatives, friends and neighbors, and thus through correspondence the importance of good eye care is reaching many more than the number who send inquiries.

The volume of letters in response to the organization's publicity is an index of the public's desire for good eye health and the extent of their motivation to obtain it.

This important service through correspondence, which is only one of Miss Butts's responsibilities, helps a cross-section of the population which NSPB would otherwise not be able to serve. It is also a contribution made by the Society in which many of its members may not realize they have a share.

EXECUTIVE DIRECTOR IN THE FIELD

Early in June Dr. Franklin M. Foote, the National Society's executive director, attended the Pan-American Interim Congress of Ophthalmology and the first Pan-American Congress for Welfare of the Blind and for Prevention of Blindness. These meetings were held concurrently in São Paulo, Brazil. At the former Dr. Foote presented a paper on "Causes of Blindness in the United States"; and at the congress on blind welfare he discussed "The Value of a Definition of Blindness." He also presided at an all-day session on prevention of blindness during the congresses' joint meeting.

While in São Paulo Dr. Foote conferred with many of the South American ophthalmologists and other Congress delegates, and visited such institutions as the Instituto de Pinheiros, a famous serum laboratory; the Padre Chico School for the Blind; and the school of public health of the Universidad de São Paulo.

En route to São Paulo Dr. Foote spent several busy days in Rio de

Janeiro in conferences at the Brazilian Ministry of Health, visiting the Oswaldo Cruiz Institute, the Benjamin Constant School for the Blind and other institutions. At an open meeting of the committee on the prevention of blindness of the Brazilian Ophthalmological Society he discussed the NSPB program and the causes of blindness in the United States.

During July and August Dr. Foote made an extensive field trip through six states, lecturing at various universities and teachers colleges. These included the University of Tennessee College of Education at Knoxville; George Peabody College for Teachers at Nashville; Southwest Texas State Teachers College at San Marcos; University of Oklahoma School Health Workshop at Norman; University of New Mexico at Albuquerque; Western State College of Colorado at Gunnison; University of Denver; University of Colorado at Boulder; and Illinois State Normal University at Normal.

Dr. Foote also attended the annual meeting of the American Association of Workers for the Blind at Houston, Texas July 12–17. At a general session he spoke on "Nationwide Status of Prevention of Blindness and of Current Research." He also participated in sectional meetings and many group conferences during this period.

SIGHT-SAVING MONTH

Observance of Sight-Saving Month began September 1 with a reminder from NSPB President Mason H. Bigelow that inadequacy of funds for eye disease research is a major reason for the increase in blindness in the United States.

Mr. Bigelow's statement opened a month-long eye health educational campaign in which all media of communications are cooperating with the National Society. Indications that the 1954 project will achieve record results were seen in the fact that by the third day of September, NSPB had received requests for the Sight-Saving Month eye care folder, "Your Wonderful Eyes," from concerned people in all 48 states.

VISION SCREENING PROGRAMS

Michigan: Three years ago Mrs. Ruby M. Hopkins, the National Society's field service consultant, met with members of the Birmingham Junior League to discuss the possibility of the League's carrying on a demonstration program of preschool vision testing. The project was accepted by the League and the NSPB nurse consultant trained the volunteers. Since that time a successful program has been developed with the complete cooperation of professional and educational groups on local, county and state levels. The current problem in that area is how to handle the large number of children whose parents wish to have them screened in this Oakland County project.

Ten Junior League members have been trained in a ten-hour course and in practice testing periods for each clinic setup. The course includes general information on the structure of the eye, given by a local ophthalmologist; the psychology of handling the young child in a clinic situation, given by a child guidance expert; also lectures on vision hygiene by a pediatrician. The way in which the preschool vision screening ties in with the board of education program is outlined by a school nurse, and there is instruction in the techniques of vision

screening. The Michigan State Department of Health has made it possible for its vision consultant, Caroline Austin, to take charge of this part of the course for recruits this past spring.

To staff the clinics adequately, a course for new technicians is considered to be advisable every second year, with a short refresher course yearly for all technicians.

A professional advisory committee representing state and local boards of health and education, pediatricians, ophthalmologists, and volunteer groups continually analyzes and evaluates this program. The local newspapers, radio and television have given excellent cooperation. Parent teacher associations have made an important contribution.

In Birmingham, Pontiac and West Bloomfield Township, during 1952–54, 93 clinics have been maintained; a total of 2,121 children tested; of these 152 were referred for eye examination. The yearly budget has been $300. Mrs. Harvey Kresge and Mrs. Gene White of Birmingham have prepared a complete report of the program from which this summary has been taken.

Colorado: In 1952 Mrs. Hopkins outlined to Mrs. Austen Brown, project committee chairman of the Denver Alumnae chapter of Delta Gamma, the vision testing program for preschool children sponsored by NSPB. With much enthusiasm the chapter decided to undertake such a project and within a few months Mrs. Burnetta Blatt, NSPB nurse consultant, had trained Delta Gamma volunteers for the work. The classes also included five nurses from the local Visiting Nurses Association, included at the request of Ruth Rataama, M.D., head of the Department of Child and Maternal Health, City and County of Denver.

In June 1953 Mrs. Austen Brown became chairman of the Colorado Committee of NSPB and she was succeeded as Delta Gamma program chairman by Mrs. William Kindel Brown of Denver.

Plans for the 1953–1954 school year included the vision screening of all preschool children enrolled in the public, parochial and private schools in the Denver area—approximately 2,000 between the ages of three and five.

All but one of the 74 preschool groups in the Denver public school system have been screened. These are under the parent education department, headed by Myrtle Curtis. The groups meet every other week for planned activities under a trained preschool teacher. The mothers meet in a different room for discussions led by outstanding pediatricians, psychologists, and other professional people. The preschool meetings last for two hours. During this time the children were screened. Outstanding cooperation was received from all school personnel.

Father Elmer Leyden, superintendent of parochial schools for the archdiocese of Denver was very happy to have the seven preschool groups under his supervision screened. He also asked whether Denver orphanages could be included in the program for next year.

In February of 1954 the Delta Gamma group was asked by the Associated Preschools of Aurora, adjoining Denver, for vision screening of their youngsters, approximately 100. A date has been set to cover these groups.

Dr. J. Leonard Swigert, head of the professional committee of the NSPB Colorado Committee has taken a deep personal interest in the project, and Dr. Leland M. Corliss, director of health service, Denver Public Schools, has been most generous with time and material. The cheerful cooperation of his staff has created a very warm feeling among all those working on the project.

In ten months of operation of the project 2,238 children have been screened in 106 schools; 127 children referred for an eye examination; 11,583 service hours given by 50 Delta Gamma volunteers. The average group of children was screened in two hours; the third hour was allowed for travel, handling equipment, filing records, etc.

California: In Santa Barbara, a similar plan has been administered by the California Committee of NSPB, of which Mrs. Harry Gradle is chairman, assisted by active and alumnae members of Delta Gamma. A testing program has been held at the Santa Barbara Recreation Center every Wednesday for two months; also at all the city's day nurseries, county and private school kindergartens. A total of 756 children have been tested, of which 52 were found to be too young for accurate results. Cases definitely needing help numbered 15; those with noticeable muscular imbalance, 22. Re-tests were done under the supervision of Dr. Louis Needels, physician of Santa Barbara County.

The program has been administered by Mrs. Gradle; Mrs. Thomas Head and Gary Collins of Santa Barbara; Elizabeth Burgess of the State Welfare Department, who is also Delta Gamma chairman; and Mrs. Frank P. Kernohan, of the Montecito School for Girls.

Indiana: The first year of vision screening of kindergarten children in the Fort Wayne Public Schools by Junior League volunteers has been completed. Trained by Mrs. Blatt of NSPB, the volunteers did the work with the cooperation of the city schools. During last year 2,267 children were screened, of which 102 were found to need a professional eye examination.

Upon the suggestion of the Fort Wayne schools the Parent Teacher Association has agreed to take over this project in the upper grades. The program is to begin this fall and these volunteers will be trained by Norine Oddou, school nurse, who has been supervising the program to date. The Junior League will continue to screen only kindergarten children during the 1954–55 school year.

ACTIVITIES OF NURSE CONSULTANT

Mrs. Burnetta Blatt, nurse consultant, has continued an extensive field program of eye health education. In June, at the request of May Hare, health education coordinator, Kansas State Department of Health, she participated in a three-day workshop at the University of Kansas. Later in the month she attended a health conference at Marshall College in Huntington, West Virginia.

During July Mrs. Blatt spent considerable time in Georgia on the invitation of Dr. Mamie Jo Jones, educational consultant for the state. Her activities there included participation in a workshop at the University of Georgia; classes at Emory University, Atlanta University and Statesboro

Teachers College. Conferences were held in Atlanta with Alvin B. Cates, chairman of the Georgia Committee of NSPB, and the executive secretary, Mrs. Louise Peacock.

In Savannah Mrs. Blatt made plans with Health Officer Claire Henderson for a forthcoming Junior League preschool vision screening project. En route to a workshop at East Carolina College in Greenville, North Carolina, she conferred with Mary King Bailey, director of public health nurses for the State Health Department in Raleigh.

At Ohio University in Athens Mrs. Blatt participated in the State Health Department conference on problems in speech, hearing and vision.

Two of the NSPB pamphlets relating to nursing problems have been revised recently: *The Public Health Nurse and Glaucoma* (No. 132), and *Eye Health—Some Basic Concepts for Nurses* (No. 131).

STATISTICAL DIVISION

Following completion of the report on Blindness in Preschool Children (now available in reprint and exhibit form) the NSPB Statistical Division turned to another project. In a new exhibit, prepared for initial use at the annual meeting of the American Academy of Ophthalmology and Otolaryngology, changing problems in prevention of blindness in the U.S.A. between 1940 and 1950 are illustrated. For the material of this exhibit C. Edith Kerby, associate for statistics and analysis, brought together all data on prevalence and causes of blindness available from NSPB studies and other sources to project balanced estimates for the entire U.S. Currently the Statistical Division is working on tabulations for the next report in its series on causes of blindness in children of school age which has been running since 1933–34.

EYES AT WORK

Meetings attended in recent months by the NSPB director of industrial service, James E. O'Neil, included the safety conferences of Central Indiana, Greater New York and the Connecticut Safety Society; also the President's Conference on Industrial Safety, held in Washington in June.

Mr. O'Neil is serving as a member of the Z-2 Committee of the American Standards Association which is now revising the U. S. Standard Code for the Protection of Heads, Eyes and Respiratory Organs. New industrial processes have greatly increased the eye hazards in many operations, and the need for code revision is recognized.

Through the cooperation of Dr. Seward Miller, chief, division of special health services, U. S. Public Health Service, and a member of NSPB's Industrial Advisory Committee, a meeting of vocational school leaders was held recently at the U. S. Office of Education. An important objective of the National Society's education program is the promotion of better eye safety practices and training in the nation's technical schools.

Special ceremonies marked the enrollment of the 5,000th member, Dexter Chapple, who is an employee of the GM Delco-Remy plant at Anderson, Indiana. The club membership certificate was presented to Mr. Chapple by Indiana Governor George N. Craig.

The 6,000th Wise Owl to be in-

ducted was Charles E. Happe, an employee of North American Aviation, Inc. at Los Angeles. Mr. Happe also was honored in a special ceremony, at which he received his club insignia from Mayor Morris Poulson of that city.

Recently the nation's 1,000th Wise Owl Club chapter was installed at Hamilton Standard Division of United Aircraft Corporation, Windsor Locks, Connecticut. On that occasion Governor John D. Lodge presented the charter to the plant. Also present was Stanley F. Withe, chairman of the Connecticut State POB Committee.

A new edition of the Wise Owl Club pamphlet (No. 493) describing the procedure for setting up a chapter has just been published and is available on request.

Mr. O'Neil recently addressed the annual dinner meeting of the Newark (Ohio) Safety Council, and a conference of the Manufacturers' Association of Berks County, Pennsylvania.

Through the cooperation of the U. S. Navy Department 12 copies of the film "To Live in Darkness" have been made available to NSPB for use in the industrial program. This excellent presentation of the importance of eye safety measures in the plant will be lent through the NSPB film service.

VIRGINIA BOARD OF OPTICIANS

On March 13, 1954, Governor Thomas B. Stanley of Virginia signed a bill to establish a state board of opticians. Beginning January 1, 1955, a certificate of registration will be required for all practicing opticians in Virginia. The board will be composed of five members whose terms will be set so that one vacancy will occur on June 30 of each year. The board will be made up of two ophthalmologists, two opticians, and one optometrist, who have engaged in their respective professional practices for at least five years.

In order to qualify for certification an applicant must pass an examination and have at least one year of training and experience as an optician under the supervision of a physician, optometrist, or registered optician, or in lieu of such experience he must have successfully completed a board-approved college or university course in opticianry. The law does not apply to physicians or optometrists.

AND HOW KEEN WAS THE VISION OF SIR LAUNFAL?

Man's earliest pastime, I suppose,
Was to play with his fingers and his toes.
Then later, wearying of himself,
He devised the monster and the elf,
Enlivening his existence drab
With Blunderbore and Puck and Mab.
A modern man, in modern Maryland,
I boast my private gate to fairyland,
My kaleidoscope, my cornucopia,
My own philosopher's stone, myopia.
Except when rationalized by lenses,
My world is not what other men's is;
Unless I have my glasses on,
The postman is a leprechaun,
I can wish on either of two new moons,
Billboards are graven with mystic runes,
Shirts hung to dry are ragtag gypsies,
Mud puddles loom like Mississipsies,
And billiard balls resemble plums,
And street lamps are chrysanthemums.
If my vision were twenty-twenty,
I should miss miracles a-plenty.

—OGDEN NASH

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AROUND THE WORLD

ENGLAND

Ophthalmology Congress—The 74th Annual Congress of the Ophthalmological Society of the United Kingdom was held at Newcastle-upon-Tyne in April, 1954 under the presidency of Mr. Alexander MacRae. The theme of this meeting was "Inflammatory Vascular Diseases Affecting the Eye." Principal speakers were Mr. R. C. Davenport and Dr. S. P. Meadows, both of London, and Professor J. B. Duguid, of Newcastle-upon-Tyne.

Mr. Davenport discussed retinal vasculitis, with particular reference to its association with various forms of uveitis. Dr. Meadows spoke on the subject of temporal arteritis and loss of vision, while Professor Duguid discussed etiology of periarteritis nodosa.

Other subjects included a study of "The Changes in the Incidence of the Eye Affections of Coal Miners in the Last 25 Years" and a symposium on "Gonioscopy After Glaucoma Operations."

Coal-Miners' Nystagmus—For years coal-miners' nystagmus has popularly been considered a psychological ailment, with its victims assumed to be anxious, hysterical, obsessional, or even malingering. In 1950, however, Drs. R. C. Browne, I. F. Beck, E. G. Saint and R. I. McCallum published a study indicating that the men who develop this disease are no different from those who do not. The results of a second study by Drs. Browne and Beck, giving further support to their original conclusions, appeared recently in the *British Medical Journal.*

In this study 50 men certified as being disabled with coal-miners' nystagmus were compared with 47 normal men selected from the same collieries as the others and matched as nearly as possible to them in respect to age and specific job. Both groups were given physical examinations, and complete medical, occupational and social histories were obtained.

Upon comparison, the medical histories, heights and weights of the two groups showed no differences except that the men with nystagmus had slightly higher pulse and respiration rates and blood pressures. They did not suffer any more psychological illness than the controls. They also had similar economic and social backgrounds, had married at about the same ages, lived in the same kind of houses, and had the same work preferences and outside interests as the controls. They were slightly more successful in their jobs than the controls, having advanced a little more quickly and spent slightly more time at higher positions. The only significant difference which appeared, after comparison of all available information about the two groups, was the fact that the men with nystagmus had spent more time

working in seams of intermediate height—that is, 3 ft. to 4 ft. 11 in. high.

In the absence of any other difference between the two groups, the authors conclude that coal-miners' nystagmus cannot be attributed to psychological causes and therefore must be somatic in origin. As a possible indication of physical cause they particularly emphasize the fact that a relationship has been shown to exist between working in seams of medium height and the onset of the disease in susceptible men.

Drs. Browne and Beck also state that careless labeling of coal-miners' nystagmus as psychosomatic has discouraged research into the physical aspects of the disease and impeded its prevention. In addition, this label has had the effect of making employers, doctors, and even patients themselves feel that victims of the disease are merely neurotic, with the result that patients often drift along indefinitely without adequate medical attention.

ACTH and Cortisone—In the *British Medical Journal* of May 22, 1954, Drs. E. H. McGehee and Kenneth MacLean presented a review of cortisone and ACTH therapy as applied to 185 patients at Guy's Hospital, London, between December 1950 and July 1953. Six of these cases involved eye conditions, all requiring long-term treatment, with very satisfactory results obtained in every case.

Four of the patients suffered from chronic non-granulomatous uveitis, which is usually well controlled for long periods on small (25 mg.) daily doses of cortisone by mouth. All four cases responded to steroids administered in various ways, including cortisone by subconjunctival instillation or drops. Occasional seven- to ten-day periods of intense ACTH therapy were followed by relatively long symptom-free periods, and one patient was maintained completely free of symptoms for three and one-half months with two ACTH drips a week. It was not until two months after treatment was stopped entirely that misty vision and ocular discomfort returned, and the patient then responded to small doses of oral cortisone.

Two more patients, both suffering from choroiditis, were given intensive courses of ACTH and a two-months follow-up on out-patient steroid treatment. The greatest improvement occurred during the first three weeks of treatment. Three months after cessation of treatment one patient noted some return of visual symptoms, which responded to oral cortisone (25–50 mg. daily). At the time of writing, the second patient had not shown any sign of relapse, although a period of five months had passed since treatment was stopped.

GERMANY

Correction Needed—According to a recent report in *The Optician*, tests of 25,000 workers in West German factories revealed that 45 per cent had vision which was inadequate for the jobs they were trying to do. The same figure has also been found in some comparable surveys conducted in the United States.

GIBRALTAR

POB Society Organized—On June 18 a flag day was held in Gibraltar on behalf of the Gibraltar Society for the Prevention of Blindness, to focus attention on and lend support to the work this group is doing.

At the present time there are about 120 blind people in Gibraltar, out of a total population of 21,000, but because of increased eye care in recent years there are no blind children under the age of ten. According to *The Optician*, however, there are many children with weak eyesight who could easily become blind if deprived of proper care. These children attend a special school where they are taught by methods used in London County sight-saving schools. Much of their work is done on blackboards or with heavy crayons on large sheets of paper, while textbooks are read through stand magnifying glasses.

Many parents in Gibraltar are strongly opposed to the idea of allowing their children to wear glasses, but the Gibraltar Society for the Prevention of Blindness has made a great deal of progress in breaking down this opposition and frequently pays the cost of children's glasses out of its own funds. This is done in cases of low-income families who are not eligible for the free glasses provided for people on public assistance.

INDIA

The Antiseptic—A monthly journal of surgery and medicine published in Madras, India, recently brought out a special Golden Jubilee Issue in honor of its fiftieth anniversary. Founded in 1904 by a group of independent medical men, *The Antiseptic* has crusaded for half a century to raise the standards of medicine in India and has played a prominent part in bringing about numerous reforms in medical education, public health service, hospital administration, and the medical services generally.

This Jubilee Issue contains an extremely interesting summary of the advances made in the practice of ophthalmology during the past 50 years, as well as articles on *Detachment of the Retina*, *Therapy of Some Ocular Inflammations Based on Immunologic Principles*, *Ocular Manifestations in Vitamin A Deficiency*, and *The Plastic Lens in Cataract Surgery*.

TRANS-JORDAN

Eye Disease among Arab Refugees—During 1953 a study was made of the occurrence and possible causes of acute conjunctivitis and trachoma at the Anjar camp for Arab refugees in Trans-Jordan. Nearly half the total population of 1,923 persons in this camp are children under 15 years.

According to the *Chronicle of the World Health Organization*, the number of eye infections were found to increase steadily during the summer months, from April to October, until at one point 36.7 per cent of the entire camp population was affected.

Control measures which were undertaken included better disposal of garbage, manure and excreta; spraying fly-breeding and fly-attractive areas with 4 per cent chlordane in oil; and practical lessons in personal hygiene among school children.

UNION OF SOUTH AFRICA

Corneal Grafts—The South African Bureau for the Prevention of Blindness reports that all eye surgeons in South Africa have been asked to cooperate in the preparation of a register of blind people, with the object of determining which ones might be helped by corneal grafts. It was also noted that a general appeal for eyes after death to be used for these grafts had resulted in offers from 550 people.

NOTES and COMMENT

• Wills Eye Bank

Plans are under way to establish an eye bank at Wills Hospital in Philadelphia, according to an announcement by the Philadelphia Board of City Trusts. Ernest R. Trigg, vice president of the board, noted that "an increase in corneal injuries by lime and acid burns, perforations and lacerations, as well as certain diseases which cause the loss of sight" had necessitated this move.

Wills Hospital, home of the new eye bank, is believed to be the site of more eye operations than any other American hospital. It is devoted exclusively to the care and treatment of eye diseases and has 88 eye specialists associated with it.

• Practitioner Fined

Following a hotly contested two-day trial on June 16 and 17, 1954, Mrs. Hilda L. Koenigsberg was convicted in Bergen County District Court of violating New Jersey optometry laws and fined $200 penalty, plus the costs of the proceeding. Although Mrs. Koenigsberg was said to be a graduate of the Hackett Association for Eye Training and was practicing its methods and system, it was established that she was neither a licensed optometrist nor a licensed physician.

• Optometry Ruling Upheld

The right of the State Board of Optometry to establish rules defining the type of advertising optometrists may do was upheld by the Florida Supreme Court last May. The court ruled that the board was within its lawful authority in prescribing that an optometrist could not display a sign containing more than his name, profession and office hours, could use no more than his professional card in a public display media, and could not display eyeglass signs of painted or decalcomania eyes.

A group of Dade County optometrists contended that the State Board exceeded its authority in establishing these rules, since it had been authorized by the legislature to prohibit only advertising which was misleading, but the court said the rules complained of were "substantially those embraced in the code of ethics governing optometrists."

• Crusading Lions

In North Carolina the State Association for the Blind is sponsored primarily by the more than 300 Lions Clubs located there. In addition to maintaining a truly inspiring record of service to the blind, the Lions of North Carolina are cooperating with the State Association in a crusade for the prevention of blindness, now the number one item on the Association's educational program. As part of this effort the Lions have taken over the job of distributing literature prepared by the Association, emphasizing the fact that 50 per cent of all blindness is preventable. With the assistance of the school authorities they have also distributed more than 50,000 book marks in the schools, each with a reminder of the importance of eye care.

REPRINT AVAILABLE

The article on "Blindness in Preschool Children" by C. Edith Kerby that appeared in the Spring 1954 issue of SIGHT-SAVING REVIEW has been reprinted. Copies are available at 10 cents each from NSPB, 1790 Broadway, New York 19.

CURRENT ARTICLES

Opacification in Perforating Corneal Grafts. A. G. Leigh. *British Journal of Ophthalmology.* Vol. 38. p. 10. January 1954.

Grafts may opacify for one of three reasons: incorrect choice of case; faulty operative technique or inadequate postoperative treatment; late complication in a graft which appeared to progress satisfactorily during the immediate postoperative period.

Good results may be expected with a central localized corneal nebula; diffuse opacity in a cornea in which the separate elements of the structure are still distinguishable; dense opacities of Descemet's membrane, if the remainder of the cornea is relatively clear; or one third or more of the cornea is of clear, normal structure.

Poor results are likely if the cornea is completely opaque; fibrosis, hyaline or other forms of degeneration are present unless these are limited to scattered islets; or gross superficial opacifications are present, particularly if associated with degeneration.

Provided that the nature of the opacity is otherwise favorable, the presence of one or two large superficial vessels does not contraindicate a perforating graft, if a considerable amount of the opacity fed by the vessel can be included in the trephine disc. Multiple fine superficial vascularization, on the other hand, is likely to cause trouble and invade the graft. In several operations performed by the author deep vascularization has not affected the graft. The author feels that the role of deep vascularization in causing opacification in grafts has been overemphasized.

Late opacification occurring in two cases six to eight weeks after grafting was found to be due to the development of a plaque of fibrous tissue over the posterior surface of the cornea.

Reports on the Use of the Intraocular Acrylic Lens (Ridley Operation). Part I. W. S. Reese. Part II. J. R. Finlay and H. Romaine. Discussion by W. E. Fry. *Transactions, American Academy of Ophthalmology and Otolaryngology.* Vol. 58. p. 55. January–February 1954.

Part I. Dr. Reese presents his experiences and impressions of 29 operations, 26 of which he performed. There is much opposition to the Ridley operation, based on the theory that a foreign body should not be introduced into the eye, but the author does not feel that the acrylic lens is harmful. Of the 29 cases, two were unsuccessful. One patient developed severe uveitis and a systemic upset; an iridectomy was performed to reduce tension and the acrylic lens was not removed. The second patient developed a dislocated lens a week after discharge from the hospital, due to manipulation by an inexperienced practitioner; after extraction of the lens recovery was good. Recently

another patient who had severe postoperative reaction began showing signs of iris bombé.

The resulting vision compares favorably with that following extracapsular extraction, but is not as good as after intracapsular extraction. There has been no postoperative hemorrhage and only one case of iris prolapse. Adhesion to the implanted lens of precipitates and cortical material has not occurred.

Part II. Drs. Finlay and Romaine feel that the choice of patient for the Ridley operation is of paramount importance, and the patient selected should have a real need for fusion. Diabetes, glaucoma, and a shallow chamber angle are contraindications, nor are patients with focal infection or grossly hypersensitive allergic patients acceptable for this procedure.

Complications such as loss of vitreous, protracted convalescence, severe iritis, glaucoma and occlusion pupillae have been encountered. In view of the hazards, this technique should be continued only on a research basis by surgeons thoroughly familiar with the procedure, and in well equipped institutions.

Of 11 cases attempted by the authors, two were abandoned at surgery because of loss of vitreous; two lenses were removed due to iritis and glaucoma, and one of these is a possible case of sympathetic ophthalmia; three patients developed occluded pupil, and one of these ended in discission and unintentional dislocation of the acrylic lens; four have had 20/40 or better corrected visual acuity, two of them having binocular vision with fusion. Iritis was present in varying degrees in all cases.

Discussion: Dr. Wilfred E. Fry gave the opinion of the panel for cataract surgery of the American Academy of Ophthalmology and Otolaryngology concerning the above results with the Ridley acrylic lens operation. Since the results in terms of visual acuity are inferior to those to be expected from conventional procedures, a majority of the panel suggest that further investigation on patients be suspended until after a five-year follow-up of the eyes already operated upon. A minority of the panel feel that further study should be restricted to experienced ophthalmic surgeons who have adequate facilities and assistance at their disposal.

The H-R-R Polychromatic Plates. I. A Test for the Detection, Classification, and Estimation of the Degree of Defective Color Vision. L. H. Hardy, G. Rand, and M. C. Rittler. *A.M.A. Archives of Ophthalmology.* Vol. 51. p. 216. February 1954.

Color vision tests are of the following types: simple screening tests to separate subjects with defective color vision from those with normal color vision; qualitative diagnostic tests to classify the type of color vision defect; quantitative tests to determine the extent of the defect; aptitude or special tests to determine fitness for a particular vocation, applicable to persons with normal color vision as well as those with color anomalies.

The H-R-R test, a series of polychromatic plates of the pseudoisochromatic type, encompasses the first three of the above categories, and is divided into four parts. The first part consists of three demonstration plates showing one, two, or no designs on a plate. The second is made up of five

screening plates. Part three contains nine quantitative and qualitative plates for diagnosing red-green defects, and part four contains four qualitative and quantitative plates for diagnosing blue-yellow defects. The symbols on all plates in the series are circles, squares, and triangles. The test can be administered in about three minutes.

The H-R-R test compares favorably with the A.O. test in detecting 150 subjects with defective red-green vision out of a group of 780 tested. It also compared favorably with the Nagel anomaloscope in classifying red-green deficiencies into "deutan" and "protan" types. ("Deutan" is a composite term for deuteranomaly and deuteranopia, while "protan" refers to protanomaly and protanopia.) The red-green deficiency was mild in 22.7 per cent of the 150 with red-green defects, medium in 30.7 per cent, and strong in 46.7 per cent.

Sulphonamides and Antibiotic Drugs in the Treatment of Trachoma. L. P. Agarwal and B. M. L. Gupta. *British Journal of Ophthalmology.* Vol. XXXVIII. p. 119. February 1954.

A series of 250 trachoma cases were studied. Fifty control cases were given no treatment except normal saline drops; 50 were given 2.5 mg./ml. terramycin drops in each eye three times a day, ointment one per cent in each eye at bedtime daily for six weeks, and four capsules a day for one week; 50 were given 2.5 mg./ml. chloramphenicol drops three times a day, ointment one per cent at bedtime, and four capsules a day for one week; 50 were given one per cent aureomycin ointment three times a day and four capsules daily for one week. The remaining 50 received 30 per cent sulfacetamide drops three times a day, 10 per cent ointment daily at bedtime for six weeks, and one sulfacetamide or sulfatriad tablet four times a day for 10 days.

Aureomycin, terramycin, chloramphenicol, and sulfacetamide were found efficacious in treating secondary infection. All were found effective to a lesser or greater extent in treating trachoma. Sulfonamides are the most effective and terramycin the least effective of these agents in the treatment of trachoma. Combined local and oral therapy are recommended.

Contact Lenses in Aphakia. E. F. Constantine and J. M. McLean. *A.M.A. Archives of Ophthalmology.* Vol. 51. p. 212. February 1954.

It has been the authors' clinical experience that patients with monocular aphakia are able to use both eyes together comfortably when properly fitted with a suitable contact lens.

Many of the difficulties of aphakic vision, including image distortion, visual field limitation, astigmatism, and heavy, unsightly spectacles, can be obviated by the use of contact lenses. Patients with monocular aphakia and a normal eye can have useful binocular vision restored safely and with relative ease through contact lenses. It is suggested that wider use be made of this device in aphakic patients.

Experimental Evaluation of Hydrosulphosol. H. Horwich and A. Turtz. *American Journal of Ophthalmology.* Vol. 37. p. 239. February 1954.

Corneal burns were produced in rabbits by direct application of solid sodium hydroxide. The animals were

then divided into five groups which were treated as follows:

A control group underwent no treatment; a second group received topical applications of hydrosulphosol; a third group received topical applications of cortisone ointment; subconjunctival injections of reduced glutathione were given to a fourth group; and the fifth group received subconjunctival injections of a cortisone suspension.

Hydrosulphosol treatment produced no better results than were found in the untreated control group. Topical or subconjunctival cortisone, or subconjunctival glutathione were similarly ineffective.

The Effect of Tripelennamine Hydrochloride on Visual Acuity, Color Perception and Stereoptic Perception as Evaluated by the Ortho-Rater. A. H. Kutscher, N. W. Chilton, S. L. Lane, and E. E. Koepchen. *International Record of Medicine and General Practice Clinics*. Vol. 167. p. 159. March 1954.

The soporific action of tripelennamine (pyribenzamine) and other antihistaminic agents is well known. This study was undertaken to evaluate the action of a typical antihistamine (pyribenzamine) upon visual performance as determined by the Ortho-Rater. The following functions were tested for near and for distance: visual acuity of each eye separately and both eyes together; lateral and vertical phoria; depth perception; color discrimination.

Twenty subjects ranging from 29 to 77 years of age were studied. Ten subjects were given a complete battery of visual performance tests before ingesting a 50 mg. placebo tablet, and a second complete series of tests was administered one hour and 30 minutes after ingestion of the tablet. A third series of tests was done on another day, prior to administering a 50 mg. tablet of tripelennamine hydrochloride, and the fourth series was carried out one hour and 30 minutes after the tablet was ingested. The other ten subjects underwent the same procedure, except that the therapeutic tripelennamine hydrochloride was administered between the first and second test series, and the placebo between the third and fourth series.

The visual factors studied were not significantly influenced by the 50 mg. dose of tripelennamine hydrochloride.

Further Experiences of Intra-Ocular Acrylic Lens Surgery With a Report of More than 100 Cases. H. Ridley. *British Journal of Ophthalmology*. Vol. 38. p. 156. March 1954.

The artificial lens composed of Tranpex, correctly inserted in an eye, is well tolerated for several years. It is not yet known whether degenerative changes would occur in the eye or the acrylic lens in 10 years or 50 years, but apparently the longer the lens is held the better it is tolerated, the clearer its surface, and the whiter the eye.

Since the intraocular acrylic lens operation was first described it has undergone little change. Vitreous loss occurred in only three out of 140 cases. The lens design is such that it renders the eye about one diopter myopic compared with the fellow eye. Intracapsular extraction and insertion of an acrylic lens have proven to be an unsatisfactory combination since the lens dislocated in 10 out of 18 cases. Insertion of an acrylic lens is performed only after extracapsular extraction.

Postoperative complications of iritis and occlusion of the pupil are frequent. A slight temporary rise of intraocular tension occurred in a few cases, but responded readily to miotics. Postoperative diplopia was encountered in a few cases in conjunction with prolonged disuse of the cataractous eye, but always disappeared spontaneously. Diabetes and other severe constitutional disorders such as gross hypertension, cardiac failure, and severe respiratory disease are contraindications to any surgery unless essential and simple. Only in one case, after traumatic subluxation, has the author removed an acrylic lens. So far no eye containing an acrylic lens has been removed by the author.

After three and one half years of experience the author's verdict is that the intraocular acrylic lens operation has a definite place in ophthalmic surgery. It restores binocular vision in uniocular cataract cases, and requires no maintenance by the patient.

Intraocular Foreign Bodies as a Surgical Emergency. L. A. Breffielh. *Journal of the Louisiana State Medical Society.* Vol. 106. p. 95. March 1954.

The removal of an intraocular foreign body should be effected as soon as possible. When removal is delayed the body's defenses against a foreign substance, by exudative and cellular responses, result in firm fibrous attachments to the vitreous and retina.

X-ray localization of the foreign body should be performed when the patient is admitted for surgery. Magnetic intraocular foreign bodies can be removed satisfactorily with the Lancaster hand magnet. Antibiotic medication must be administered in all cases of intraocular foreign bodies. Ocular irritation can be minimized and ocular tension controlled effectively by administering local cortisone.

Degenerative Changes in the Rat Visual Pathway When Thiamin and Riboflavin Deficiencies are Combined. F. C. Rodger. *British Journal of Ophthalmology.* Vol. 38. p. 144. March 1954.

The effects of thiamin and riboflavin deficiencies on the visual pathway were studied in three groups of rats fed a high carbohydrate diet. One group was given adequate riboflavin and an inadequate amount of thiamin, producing chronic thiamin deficiency. In a second group chronic riboflavin deficiency was produced. The third group received inadequate amounts of both thiamin and riboflavin and developed chronic deficiencies of both vitamins.

The six thiamin deficient rats (given minimal amounts of thiamin) died after 75 to 85 days, at which time slight signs of degeneration were found in the visual pathways. Eight riboflavin deficient rats were still alive after 220 days, and when autopsied no degenerative changes were evident in the visual pathways. The thiamin-riboflavin deficient animals (given minimal thiamin supplements) lived until the experiment was terminated on the 200th day. Gross degeneration of the visual pathways was found in this group. Control rats receiving full supplements of both vitamins were not affected. Six animals given diets free of thiamin and riboflavin, plus pyrithiamin (analog of thiamin whose effect is antagonistic to thiamin) became acutely deficient in thiamin and riboflavin, and were moribund after

19 days, when the experiment was terminated. No abnormalities were found in the visual pathways.

The lesions of the visual pathway were further advanced in the animals with a more prolonged thiamin deficiency, i.e., the chronic thiamin-riboflavin deficient group. The optic nerve tract fibers of these animals were distorted, swollen, varicose and tortuous, with enlarged, sometimes fragmented endings and increased argyrophil ring-shapes. The sheaths underwent diffusely scattered demyelinization, especially in the tract. The final visual neurones were sclerosed and hyperchromatic, their processes swollen to nearly twice their natural size.

These studies seem to support the theory that when B vitamins are deficient and the diet is high in carbohydrates the factor responsible for nutritional amblyopia is thiamin.

Age and Sex in Eye Injuries of Children. T. F. Schlaegel, Jr., and P. F. D. Seitz. *Psychosomatic Medicine.* Vol. 15. p. 349. July–August 1953.

In a statistical study correlating age, sex, and eye injuries in children, a review was undertaken of the medical records of all patients admitted to the James Whitcomb Riley Hospital because of eye injuries. The total number of eye-injured children up to 15 years of age was 218, of whom 171 were boys, and 47 girls. The data show that this difference is highly significant statistically. Of other-than-eye injuries selected at random from the hospital files 60 per cent occurred among boys and 40 per cent among girls.

Among girls there was no age period during which the incidence of injury to the eyes was significantly greater or smaller than would be expected on the basis of the incidence of other injuries. For example, 28 per cent of the girls with eye injuries were three years of age or younger, while 31 per cent of the girls with other injuries were in that age group. In contrast to this, boys in the age period 0–3 years sustained relatively fewer eye injuries than other types of injuries. From ages four to six and ten to 12 years boys incurred more eye injuries than would be expected based on the age distribution of other injuries, and in comparison with girls. In the 13 to 15 year group, boys had relatively fewer eye injuries than other types of injuries.

Increased general activity, clumsiness, or play involving danger to the eyes do not explain the findings in the four to six and ten to 12 year groups of boys. "A possible explanation for the findings of the present study is age and sex differences in psychosexual development," the authors suggest. "Psychiatric investigation of children with eye injuries may ultimately provide the data upon which such psychodynamic formulations may be based."

Trauma. A. D. Reudemann. *Kresge Eye Institute Bulletin.* Vol. 5. p. 5. August 1953.

In dealing with injuries to the eyes it is important to determine the cause of the injury; the distance between the injured person and the object; if chemical, the concentration of the material, whether it was acid or alkali, hot or cold; and the force of the blow.

Chemical burns are treated initially by thorough washing with water to dilute the chemical material and then it is well to instill a bland substance

such as castor oil or methylcellulose. After neutralization acid burns usually heal; but alkaline burns give rise to secondary fibrosis, secondary glaucoma, or other complications resulting in poor prognosis for sight. Corneal burns and deep corneal scarring are produced when anything hot strikes the eye, according to the intensity of the heat. Mucous membrane graft conjunctival flaps aid in the recovery of the eye.

Contusions of the eye may cause retinal detachment, the lens may become dislocated, and the globe may be ruptured. Such injuries may reveal themselves later by choroiditis, choroidretinal tears, and secondary optic atrophy. If the contusion is accompanied by great heat or chemical injuries enucleation is usually necessary.

Injuries to the eyebrows are not usually dangerous to sight but may result in disfiguring scars. Injuries to the eyelids, however, may be a serious hazard to future eyesight, in that they may produce photophobia, lacrimation, blepharospasm, and may render the eye permanently disfigured. Repair of the eyelid is extremely difficult.

Cataracts in Galactosemia. J. Johnson. *American Journal of Ophthalmology.* Vol. 36. p. 1380. October 1953.

Galactosemia, or galactose diabetes, a rare congenital defect in galactose metabolism, has among its outstanding features enlargement of the liver and spleen, failure to gain weight, reducing substance (galactose) in the urine, and cataracts. In all but one of the cases reported since 1945 cataracts were present. The one exception was the case of a child whose condition was diagnosed and in whom treatment was begun prior to two weeks of age.

Three cases of galactosemia with cataracts are reported. Treatment consisted of removing milk, which contains galactose, from the diet. The first patient, three weeks old on admission to the hospital, improved within two weeks. At that time the lenticular opacities had cleared completely and the size of the liver and spleen had returned to normal. The second patient, four months of age when admitted to the hospital, was discharged 16 days later in a much improved condition. There was, however, no appreciable change in the lens opacities. Seven months later the cataracts were markedly improved, although some peripheral opacities remained. The third patient was a year old at the time of admission to the hospital. Slight improvement was made on a milk-free diet, but the lens opacities were unimproved. In the first two cases there were suggestive histories of galactosemia in siblings; the third was an only child.

It is essential that treatment of galactosemia by removing milk from the diet be begun before the third month of life to prevent irreversible lens changes.

Focus on Vision. Dorothy Brinkley. *American Journal of Nursing.* Vol. 53. p. 1224. October 1953.

Improved production, morale, and health, as well as reduced absenteeism and turnover are the results of the vision testing program begun in 1949 at the Motorola Plant, Chicago.

Visual screening of 100 inspectors on the production line was carried out with the Ortho-Rater. The results indicated that 30 had vision inadequate for their work. Among the poorest workers in this group, 63 were below

the visual standard for inspection work; 23 per cent of the average workers and 33 per cent of the best did not meet the standard for their jobs.

These workers were referred to an ophthalmologist or optometrist and were allowed a maximum of $5.00 toward payment of the fees. Five per cent of them could not be corrected; three were color blind and were placed on other jobs; the rest were retained as inspectors. In studying the absentee records of inspectors, it was found that 72 per cent of those who needed correction had lost time from work, while only 45 per cent of those with adequate vision had lost time.

The vision program has been extended to all parts of the plant. New employees are tested before they are hired, and placed in jobs for which their visual qualifications are adequate. They are retested annually. Those needing correction are referred to a member of the company's panel of two ophthalmologists and four optometrists. Corrective-protective plastic framed safety glasses are provided.

Between 1949 and 1950 the following concrete benefits resulted: Training time for inexperienced employees was reduced from 80 hours to 40 hours; for experienced people from 40 hours to 16 hours. The turnover in 1950 was 18 per cent lower, attendance five per cent better, and productivity 10 per cent higher. The number of "reject sets" dropped from 15 per cent to seven per cent. In 1949 there was an average of six clinic visits per employee for intestinal disturbances and headaches; in 1950 this figure dropped to 3.4 visits. Machine accidents were reduced by one third in 1950, in spite of the fact that the number of workers on machine operations was doubled.

Light and Night Traffic Accidents. D. M. Baldwin. *Illuminating Engineering*. Vol. XLVIII. p. 515. October 1953.

Motor vehicle traffic accidents in the United States took the lives of 38,000 men, women and children during 1952. Over 70 per cent of these deaths occurred in rural areas. Forty-five per cent occurred during daylight and 55 per cent during hours of darkness, including dusk and dawn. In view of the fact that only 38 per cent of the total number of accidents occurred at night, the large proportion of fatal accidents during those hours indicates the greater severity. Of the fatal urban accidents 59 per cent occurred during darkness, while in rural accidents 53 per cent of the fatalities occurred at night.

These figures can be related to pedestrian accident experience, accounting for half of the urban death total, but only one seventh of rural fatalities. Taking into account the relative amounts of travel during daylight and darkness, it can be said that one's chances of being involved in a fatal accident at night are three times as great as during the day. This proportion holds in rural as well as urban areas.

The most obvious difference between day and night driving is visibility. Added to this may be such contributory factors as fatigue and alcohol, and differences in the drivers themselves. There is a greater proportion of reckless driving among the 20 to 24 year age group, between midnight and 4:00 A.M., than in any other age group at any other time.

Street lighting improvement is almost invariably followed by fewer

accidents and deaths. Substantial records in this area have been achieved in Detroit, Milwaukee, Kansas City, and elsewhere. Although alcohol, fatigue, and reduced visibility all must be recognized as factors in night accidents, the most direct and obvious approach in accident prevention is the improvement of street lighting.

Glucose Utilization of the Retina. II. Influence of Various Hormones on the Glucose Utilization of the Retina. W. Kornblueth, E. Yardeni-Yaron, and E. Wertheimer. *A.M.A. Archives of Ophthalmology*. Vol. 50. p. 500. October 1953.

The results of this study indicate that glucose utilization of the retina is independent of hormones *in vivo* and *in vitro;* it is also unaffected by various hormonal deficiency states.

The study was carried out on albino male rats. Thyroxine *in vitro* and *in vivo*, thyroidectomy, and propylthiouracil *in vivo* did not produce any significant changes in retinal utilization of glucose. Severe hypoglycemia following insulin injection did not alter the glucose uptake of the retina, nor was there any effect from insulin *in vitro*. Chronic mild diabetes and chronic severe diabetes did not change the rate of glucose uptake of the retina. Epinephrine *in vitro* and *in vivo*, desoxycorticosterone glucoside *in vitro*, and cortisone injections *in vivo* did not affect retinal glucose uptake. Injections of anterior pituitary extract, hypophysectomy, and castration were also without effect.

Glucose metabolism in all tissues other than the retina may be altered by one or more of the hormones mentioned, or by endocrine deficiency states. Even the brain, which is free of hormonal influence under normal circumstances, may be affected.

Changes in Refraction During Life. M. Bücklers. *British Journal of Ophthalmology*. Vol. 37. p. 587. October 1953.

In hyperopic persons the curve of refractive error shows a steeper ascent during the first two decades than after the period of growth. After about 20 years of age the changes in refraction are usually small.

In general a quick and steady increase of myopia may be expected when the onset is early and of a high degree. However, exceptions have been noted. In some cases myopia becomes constant early, and this may apply to low as well as high myopia. Sudden and distinct increases of myopia have been noted occasionally in cases that had remained stationary up to the fifth and sixth decades of life. Lessening of myopia during the course of a lifetime is sometimes noted. Hyperopia is generally stationary in its course, although steeper increases are noted for a few years in youth than later in life. It is demonstrated that the change in refraction for each eye is determined throughout life by endogenous factors and is not explained by external influences.

Studies on the Electrophysiology and the Metabolism of the Retina. W. K. Noell. USAF School of Aviation Medicine, Project No. 21-1201-0004, Report No. 1. October 1953.

This report concerns the analysis of metabolic and functional properties of the retina. Its application for the Air Force is to provide a basis for evaluating the effects of abnormal conditions on the retina and nervous system.

Electrical and histological phenomena of the mammalian retina are studied and the effects of various poisons tested in order to determine relations between the metabolism of the retina and its function. The study is based upon the effects of intravenously administered agents (iodoacetate, sodium iodate, and azide) in rabbit, cat and monkey. These agents affect visual cells and pigment epithelium in a highly selective manner. They serve to analyze (1) the dependence of the visual cells upon glycolysis, (2) the pathogenesis of retinitis pigmentosa, (3) the participation of the pigment epithelium and glia in the maintenance of retinal homeostasis, (4) the localization and mechanism of generation of the electroretinogram, (5) the organization of retinal impulse activity.

Effect of Melanophore Hormone on Regeneration of Visual Purple in Solution. T. Hanaoka. *Nature.* Vol. 172. p. 866. November 7, 1953.

Melanophore hormone, apart from the hypophysis, is concentrated only in the eye and thalamus. Nocturnal animals have more of this hormone in the hypophysis than diurnal animals; the amount of melanophore hormone increases on dark adaptation. By subcutaneous injection of highly purified melanophore hormone, the author has shown that in man this hormone shortens the time of dark adaptation and also considerably increases sensitivity to light. The hormone also has an augmentative effect on the regeneration of visual purple.

Although *in vivo* the hormone accelerates regeneration of visual purple, the question arose whether this is due to direct participation in regeneration or to the indirect influence of some retinal condition, e.g. blood circulation. Tests were conducted, therefore, to ascertain the action of melanophore hormone on visual purple itself, in solution. Melanophore hormone was added to an extract of visual purple from frog retina, and to two other portions of visual purple extract distilled water was added. All solutions were exposed to light for ten seconds to reduce the visual purple content to about 75 per cent of the initial value. After bleaching, the portion containing melanophore hormone and one of the control portions were incubated in the dark for two hours and the second control portion was analyzed for visual purple content. When incubation was completed visual purple was determined in the other portions. In the controls the amount of visual purple either increased very slightly or degenerated further. In the solutions containing melanophore hormone there was always some regeneration of visual purple, and this always exceeded that of the controls. These experiments indicate that melanophore hormone has an effect on the regenerative process.

An Epidemic of Conjunctivitis in Colorado Associated with Pharyngitis, Muscle Pain, and Pyrexia. T. A. Cockburn. *American Journal of Ophthalmology.* Vol. 36. p. 1534. November 1953.

An epidemic of acute conjunctivitis associated with vesicular pharyngitis, muscle pains and pyrexia appeared in Greeley, Colorado, in August and September 1951. In most cases acute nonpurulent conjunctivitis was followed by mild keratitis, but in some instances conjunctivitis was not present and the other features predomi-

nated. It is likely that all the manifestations resulted from one type of infection. A total of 206 cases was reported; however, the data given deal only with the 58 patients seen by the author and a public health nurse.

The conjunctivitis, a moderately severe follicular inflammation without purulent discharge, little edema, and no sign of false membrane formation, did not cause undue discomfort; few patients complained of real pain or photophobia. The average duration was about one week. Three weeks after onset, in 13 out of 54 cases, the corneas were found to have small, whitish subconjunctival plaques that were not associated with ulceration.

Soft-walled vesicles were found frequently on the soft palate, fauces, or base of the tongue, and when these were broken, ulcers formed, lasting for several days. Occasionally tonsils were enlarged and reddened. In only three cases the preauricular glands were enlarged, but small glands were always present in the neck. Most of the patients ran temperatures of 102.5 to 105 for one to five days. Pains in the back or legs and stiff necks were reported by a substantial proportion of patients.

Laboratory studies revealed no bacterial pathogens in eye scrapings and washings, no inclusion bodies in conjunctival scrapings, and convalescent sera tested against Leptospira were reported negative. Studies of throat washings likewise failed to incriminate any organism as the causative agent.

The disease appeared almost exclusively in children and young people under 20 years of age; only three of the 58 patients were over 21, and one of these was a mother who infected herself from her child. Thirty-five of the patients were males, 23 females.

Transmission of the disease, which the author calls Greeley disease, apparently occurred by direct transfer of infected materials or by association with a swimming pool. Two other epidemics were found in Missouri and Colorado with the same combination of symptoms during the same months of the year.

Ocular Complications Associated with Malaria. J. V. M. Ross. *Eye, Ear, Nose and Throat Monthly.* Vol. 32. p. 707. December 1953.

Malaria and its treatment are associated, at least chronologically, with many ocular disturbances. A possible common pathological basis, vascular obstruction, is discussed for all ocular complications due to the disease process. Eye lesions, predominantly of the cornea, developing during the acute phase of malaria are usually monocular, moderately incapacitating, and may leave permanent sequelae. Those occurring in the chronic phases are more likely to be bilateral, involving the posterior segment. They are apt to result in more serious final visual damage. Treatment with antimalarial drugs has been generally successful. However, herpetic ocular disturbances, severe intraocular and ocular neurological lesions, and the complications of the therapy itself do not respond to antimalarial treatment.

Sub-Normal Vision Aids. B. S. Abrams. *The Optometric Weekly.* Vol. XLV. p. 181. February 4, 1954.

Subnormal vision is defined by the author as any visual defect which in the normal course of refraction cannot be suitably aided so as to permit the individual to perform visual tasks necessary in pursuing a satisfactory

way of life. This subject is being given more attention by optometrists today than at any time in the past decade.

The author feels that partially seeing individuals should be trained and aided to use their sight so that they can receive the greatest possible benefit. Before the use of subnormal vision aids is begun, however, all cases should be referred to an ophthalmologist to determine the diagnosis, whether there is any chance of improving vision by medical methods, and whether magnifying devices could or would have any ill effects on the existing vision. No lens should be applied if medical aid can be given. The uses of various types of lenses, including high plus-lenses to give magnification, binocular loupes, contact lenses, telescopic lenses, and microscopic lenses, are reviewed.

Clinical Detection of the Genetic Carrier State in Ophthalmic Pathology. H. F. Falls. *Transactions of the American Academy of Ophthalmology and Otolaryngology.* Vol. 57. p. 858. November–December 1953.

Genetic carriers may be defined as individuals possessing the potentialities of transmitting inherited diseases, although they themselves show no or only a slight deviation from the normal. The genetic make-up of such persons may be in any one of the following four categories:

1. Individuals may be heterozygous for a trait commonly thought of as recessively inherited, but actually due to an incompletely dominant gene. Such genes may be carried in the autosomal or sex chromosomes. Sex-linked ocular diseases in this classification include choroideremia, choroidoretinal degeneration, sex-linked albinism confined to the eye, keratosis associated with corneal degeneration, congenital ophthalmoplegia, megalocornea, color vision anomaly, and congenital anhidrotic ectodermal dysplasia. Diseases in this group due to autosomal genes are xeroderma pigmentosa, strabismus, juvenile amaurotic idiocy, generalized albinism, Wilson's disease, keratoconus, and Laurence-Moon-Bardet-Biedl syndrome.

2. A gene may be present for a trait which first appears clinically in adolescence or even in middle or late life. Glaucoma, essential hypertension, gout, ankylosing spondylitis, and Fuchs' epithelial and endothelial dystrophy are in this category.

3. Affected individuals may show only mild or minor effects of a dominant gene which, when transmitted to the next generation, may exhibit a more serious condition. This category includes phakomatoses such as von Recklinghausen's neurofibromatosis and tuberous sclerosis; Marfan's syndrome; Waardenburg's syndrome; status Bonnevie-Ullrich; Ehlers-Danlos syndrome; myotonia dystrophica; essential familial hypercholesteremia; osteogenesis imperfecta; and mandibulofacial dysostosis.

4. The carrier may have clinically detectable departures from normal, relatively innocuous in character, for which the specific genetic mechanism is unknown, for example diabetes mellitus and allergic diseases. Among the latter, the author includes migraine, attacks of which may be precipitated by an allergic state.

A high degree of suspicion or awareness of the hereditary nature of various disease entities is a prime requisite to detecting the carrier state. Many clinically similar conditions have different genetic transmission patterns,

and many genes produce multiple effects. To disclose all signs and symptoms of a specific complex, the entire family should be studied. Prognosis may thus be aided as to onset, course and severity of the specific disease.

Review of 555 Cases of Intraocular Foreign Body with Special Reference to Prognosis. M. J. Roper-Hall. *British Journal of Ophthalmology*, Vol. 38. p. 65. February 1954.

In this review of 555 cases of intraocular foreign body, orbital foreign bodies and nonpenetrating corneal and scleral foreign bodies are excluded. The highest incidence was found between 21 and 40 years of age.

The majority of intraocular foreign bodies in civilian practice are magnetic, but in recent years the percentage of nonmagnetic foreign bodies has increased slightly. In cases with retained nonmagnetic foreign bodies the visual results are better than in the series as a whole, but the excision rate is higher. Early excision is often required due to severe inflammation from brass and copper bodies. If these are retained without inflammation, however, the prognosis is as good as that of magnetic foreign bodies.

No evidence is presented to support the view that improvement of vision is likely in cases of siderosis after removal of the foreign body. Extraction of the cataract in cases of siderotic cataract, however, has had a satisfactory result.

Uveal prolapse should not be regarded as evidence of the absence of an intraocular foreign body. The general prognosis is not altered in cases of uveal wound without prolapse. The presence of cataract considerably reduces the possibility of good final vision, but does not markedly increase the risk of losing the eye.

Retinal detachment is unlikely unless the foreign body is in the posterior segment. The author feels that a causal relationship is probable between the frequently associated retinal detachment and intraocular hemorrhage.

Visual Fatigue. H. C. Weston. *Illuminating Engineering*. Vol. 49. p. 63. February 1954.

Visual fatigue may be defined in terms of the ordinary conception of fatigue as weariness resulting from the bodily and mental exertion of seeing. The questions, "How can weariness or tiredness of sight come about?" and "What conditions of lighting can bring it about?" are considered in this paper. The "stuff" of vision, sensations of light and color, must first be gotten and then "made up" before seeing is accomplished. The getting is done by "a multitude of receptors housed in rotatable globes" which may be turned as a body in various directions. This and other movements involved in seeing have a great deal to do with visual fatigue. The "making up" of vision is the task of the brain.

More precise expressions ought to be used to refer to fatigue from particular functions, for example, convergence fatigue, accommodation fatigue, and fatigue of the retina (retinal asthenopia). In attentive vision the body's whole voluntary neuromuscular system may be involved, and accordingly, the fatigue that ensues may be general, although it is occasioned by looking. Posture of the eyes and head, muscular reaction to glare, frowning, elevation of the eyes, visual boredom, and distracting and confusing

brightnesses are discussed in relation to visual fatigue.

Suboptimal conditions of lighting for particular visual tasks accelerate the onset of fatigue, chiefly because of undue muscular exertion in getting the required visual information. Also, undue mental exertion for the processes of interpretation and discrimination causes fatigue under suboptimal lighting conditions.

Visual Acuity—Results of a Survey of 10,000 Persons. R. Wilson and W. E. McCormick. *Industrial Medicine and Surgery.* Vol. 23. p. 64. February 1954.

Visual screening tests given to 10,372 B. F. Goodrich Company employees were conducted with the AO Sight Screener. The tests should be considered as a means of survey rather than as diagnostic, and final determination of an individual's actual visual acuity should not be made by this test.

An effective means of promoting employee relations and improving employee morale is the offering of a visual screening test on a voluntary confidential basis. From such a program, started on the basis of the benefits it offers to the employee, better quality and more efficient production may be expected.

"Unsatisfactory" vision (less than 20/40) was found in a greater percentage of older individuals than younger ones. Visual quality was not found to be a great factor in causing accidents. Younger men under 40 have more accidents, both major and minor, than men over 40 years of age, while unsatisfactory vision is more frequent in men over 40. It is confirmed that older more experienced workers are safest, while younger people have more accidents. Within each age group the incidence of accidents did not vary greatly between the employees with satisfactory vision and those with unsatisfactory sight.

More females had uncorrectable defects than males. Uncorrectable defects increase with age. Depth perception deficiency is the most prevalent and one-eye suppression is the least prevalent defect. One-eye suppressions were more frequent among males (10 per cent of males and 1.8 per cent of females).

Ninety per cent of the employees over 50 years of age and 53.6 per cent of all employees between 21 and 65 years of age, regardless of their work assignments, were found to need corrective glasses.

Symposium: Inflammatory Conditions of the Eye. W. L. Benedict, J.V. V. Nichols, F. W. Newell, J. F. Minnes, N. Elvin, T. H. Hodgson, J. P. Boley, J. W. Duggan, and A. E. Braley. *Modern Medicine.* Vol. 22. p. 77. January 15, 1954.

In an introductory section, Dr. William L. Benedict discusses the pain and potential permanent damage that can be provoked by a seemingly insignificant, small foreign body embedded in the cornea, and the danger of seemingly mild infections of the eyelids, conjunctiva, or cornea. The red eye, or even the slightly pink eye, is a warning that cannot be disregarded since it may harbor a serious infection. Differential diagnosis depends on identification of microscopic organisms, bacteria and viruses, or on reaction to therapeutic agents with a limited zone of activity.

The symposium presents the highlights of modern concepts about the

eye conditions characterized by external congestion or redness. Recent advances in therapy are discussed by Dr. John V. V. Nichols; uveitis by Dr. Frank W. Newell; allergic conditions of lids, conjunctiva and cornea by Dr. James F. Minnes; the cornea by Dr. Norman Elvin; glaucoma by Dr. T. Harold Hodgson; eye injuries by Dr. J. P. Boley; bacterial infections of lids and conjunctiva by Dr. J. Winston Duggan; and virus infections by Dr. Alson E. Braley.

Oxygenation and Retrolental Fibroplasia. T. H. Ingalls and N. Purshottam. *New England Journal of Medicine.* Vol. 250. p. 261. April 15, 1954.

The literature on the etiology and development of retrolental fibroplasia is reviewed. The authors term the condition the end stage of retinal vascularization brought on most frequently in premature infants by excessive oxygen supply in neonatal life.

The onset and severity are probably influenced by other factors: excessive warmth and humidity, electrolyte shifts, antioxidants and enzyme derangements, which limit survival and may determine ocular disease in the immature fetus. The mechanism postulated for the development of retrolental fibroplasia is histotoxic anoxia incited by derangement of tissue enzymes at critical periods of fetal development.

Evidence is presented that the anomaly of the retinal vasculature has been prevented by careful attention to the optimal supply of oxygen. The authors predict that as the incubator-induced form of retrolental fibroplasia is brought under control, a sporadic form will emerge which depends on a series of circumstances resulting in repeated or prolonged bouts of anoxia and on some of the other factors mentioned.

The Cross-Eyed Child. R. D. Harley. *Medical Times.* Vol. 82. p. 85. February 1954.

Although many people, including some physicians, are of the opinion that nothing can be done for strabismus until the child is old enough for subjective examination, the ideal time to begin correction is immediately after recognition of the condition. At about the age of six months the eyes should begin to show coordination and parallelism. If the child's eye remains crossed beyond this time attention is necessary. If left unattended, the eyes will show some permanent defect.

Correction of the resulting amblyopia may involve occlusion of the good eye to force the poor eye to work; prescription lenses; eye exercises; surgery; or a combination of these measures. When surgery is indicated it is essential that it be accomplished as soon as possible. Best functional results are achieved before the child has entered school. If muscle surgery is delayed the eyes can still be straightened satisfactorily but the functional result is not good.

HARDY MEMORIAL FUND

Announcement has been made of the establishment of a fund for furthering research in the study of physiological optics, to be named for the late Dr. Le Grand H. Hardy, in recognition of his great interest in that subject. Contributions may be sent to The Hardy Memorial Research Fund, Institute of Ophthalmology, 635 West 165th Street, New York 32, N. Y.

BOOKS AND PAMPHLETS

Textbook of Preventive Medicine. Hugh R. Leavell and E. Gurney Clark. McGraw-Hill Book Co., New York. 1953. 629 p. $8.00.

In this new text for undergraduate medical and dental students the authors, assisted by 19 outstanding collaborators, approach preventive medicine from the viewpoint of epidemiology or the natural history of disease in aggregations of individuals.

Of significance to those interested in sight conservation are the objectives of preventive medicine as stated in this text: to promote a positive state of health, to prevent departure from it, and to prevent disabling illness after disease agents have gained access to man. The approach to health promotion and disease prevention, they feel, should be no less dynamic than the disease processes themselves. They outline at least five levels at which preventive measures may be applied: (a) promotion of general health, particularly before a disease or disorder has its onset; (b) specific protection; (c) early recognition and prompt treatment; (d) limitation of the extent of disability chiefly by therapeutic or palliative measures; (e) rehabilitation.

Using this approach, various authors discuss such topics as infectious diseases, cancer, nutrition, heredity and occupational health. Five pages are devoted to a discussion of eye diseases and defects. Ophthalmoscopy and skiascopy are recommended for every child at two to three years of age, to be repeated at six to eight years when better cooperation will be obtained from the child. After the age of thirty eye examinations are recommended every three to five years, and after fifty every year or two. Lloyd Florio, who prepared this section, recommends that the tonometer be used in every such examination after the age of thirty. He recognizes that the frequency of the eye examinations recommended will require many additional workers in the eye field, but believes that trained persons under competent medical supervision may be used. Pointing out the present limited national program for the prevention of disability from blindness, Florio comments, "a niggardly investment in a cause so worthy."

The final chapter on biostatistics provides an excellent introduction to an understanding of numerical data in the field of medicine; the variations between individuals; use of mean and of standard deviation to describe a normal distribution; probabilities and tests of significance; the ways that bias can enter into a selection of controls; the interpretation of rates and ratios.

This original approach to the study of problems of preventive medicine should enable an instructor to present a highly stimulating course to medical and dental students.

Perimetry. Joshua Zuckerman, M.D. J. B. Lippincott Company, Philadelphia. 1954. 394 p. $10.00.

In the belief that the process of teaching perimetry is comparable in many respects with the teaching of a new language, the author, who is well known as an instructor in this field, introduces the subject in a simple, evolutionary manner. As the vocabulary

and phraseology of perimetry are absorbed, an understanding of the actual text matter of the book is facilitated.

Part Two deals with the various methods of examination of the fields of vision; the affections of the various parts of the visual pathway; and the interpretation and evaluation of their corresponding field defects.

The whole subject of perimetry is recapitulated in a descriptive review in Part Three. This section includes other helpful data; for example, a discussion of the visual fields in some systemic diseases. Perimetry is considered to be of importance not only to the ophthalmologist but to the neurologist and internist as well.

Original data offered by the author include a new concept of the field of vision; also a new code devised to depict color isopters and relative scotomas without resorting to the use of colors, and for indicating the various isopters for form when several are recorded on the same chart. The text is profusely and clearly illustrated with graphs, charts and diagrams.

Readings in the Theory and Practice of Medical Social Work. Edited by Dora Goldstine. The University of Chicago Press. 1954. 344 p. $5.00.

This collection of articles reprinted from various professional journals covers the range of activities carried on by medical social workers in relation to casework services to patients in medical or health agencies; the administration of social service programs in such settings; participation in community organization activities; and contributions to professional education and research.

As a cross-section of medical social work literature it affords to both the lay and social work reader a good perspective of the variety of casework problems in the health field, with the basic concepts and professional skills brought to bear on their solutions. The chapter entitled "Problems of the Handicapped Child as Met by the Medical Social Worker" by Mildred E. Hearsey includes two case illustrations pertaining to children with serious eye conditions. One situation was a referral to a clinic arranged by the National Society for the Prevention of Blindness.

Miss Goldstine plans a second volume in the near future on the broader aspects of program planning and some of the newer developments in medical social work which will be a valuable complement to this set of readings.

Clinical Orthoptics, Diagnosis and Treatment. Second edition. Mary Everist Kramer. C. V. Mosby Company, St. Louis. 1953. 534 p. $12.50.

Since publication of the first edition of this book five years ago knowledge of the physiology of vision has broadened. There is an ever-increasing understanding of the disorders of binocular vision and ocular motility. Ten years ago, says the author, who is a certified orthoptist in Kansas City, a functional cure for strabismus was admittedly in the minority . . . today, such a result can be a routine occurrence in the orthoptic clinic. She believes that improved home techniques make it possible for the patient to be treated effectively and quickly in home training exclusively. He sees the orthopist every two weeks for a check of progress and training in new skills.

This is a reference text designed for the student. It contains basic knowledge of the subjects pertaining to

orthoptics; the principles and techniques of the diagnostic tests; and methods of treatment of the ocular motor anomalies. A further objective is to give the doctor and technician a working knowledge so that they may apply clinically these principles in diagnosis and treatment.

Successive chapters of the book deal with anatomy; the visual pathways and oculomotor system; physiology; extrinsic eye muscles; optics; orthoptic training; strabismus; instrumentation, tests, and techniques; fusion; suppression; and other related subjects. Wade Hampton Miller, M.D., has contributed the chapters on anatomy, physiology, neurology and surgery. Excellent typography and illustrations add greatly to the usefulness of the text.

Optometrists Offer Glasses

Under a new program adopted by the Essex County (New Jersey) Optometric Society eye examinations and glasses will be furnished free of charge to those who cannot pay. All the patient will have to do is obtain a letter from his clergyman, family doctor, or any professional acquaintance attesting his lack of funds, and take it to any neighborhood optometrist who is a member of the society. The optometrist will forward this letter, with the patient's application, to the secretary of the society and a committee which will conduct a routine fact check.

If the applicant is found to be eligible for assistance he will be referred either to an optometrist of his choice or to the nearest member of the society for examination. Not only will this be performed without charge, but any lenses which may be prescribed are to be paid for out of a society fund.

Define "Orthoptic Technician"

In a bill recently passed in Kentucky, providing general amendments to the optometry law, "orthoptic technician" is defined as a person who trains and directs individuals to engage in ocular exercises designed to correct visual defects. The law provides that such persons shall not be required to be licensed as optometrists providing that such training and direction are done pursuant to and under the instructions of a duly licensed physician, osteopath, or optometrist and consist solely of visual training or orthoptics or ocular exercises.

Acuity Test

Since children's responses vary and it is often difficult to hold their attention, testing their visual acuity may be unreliable, stated Dr. Richard U. Stern in a recent note in *Transactions of the American Academy of Ophthalmology and Otolaryngology*. Snellen "E" charts, probably the most reliable type of testing device, tend nevertheless to confuse the child, he believes, since attention may wander from the particular letter being tested to one of the other letters on the chart.

Dr. Stern suggests the use of separate, adhesive-backed plastic "E's" of specified sizes, mounted one at a time on a radiographic shadow box. The letter may be turned in any direction. The test is repeated with progressively smaller letters, ranging in size from 20/200 to 20/20. This method minimizes distraction and has been used successfully to test children as young as two years of age to the level of 20/30 vision in each eye.